Naval Education and Training Command

NAVEDTRA 82338
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Nonresident Training Course (NRTC)

Aviation Structural Mechanic (H & S) 3 & 2

Only one answer sheet is included in the NRTC. Reproduce the required number of sheets you need or get answer sheets from your ESO or designated officer.

0503LP4774100

AVIATION STRUCTURAL MECHANIC (H & S) 3 & 2

NAVEDTRA 82338

Prepared by the Naval Education and Training Program Management
Support Activity, Pensacola, Florida

Congratulations! By enrolling in this course, you have demonstrated a desire to improve yourself and the Navy. Remember, however, this self-study course is only one part of the total Navy training program. Practical experience, schools, selected reading, and your desire to succeed are also necessary to successfully round out a fully meaningful training program. You have taken an important step in self-improvement. Keep up the good work.

HOW TO COMPLETE THIS COURSE SUCCESSFULLY

ERRATA: If an errata comes with this course, make all indicated changes or corrections before you start any assignment. Do not change or correct the Training Manual (TRAMAN) or assignments in any other way.

TEXTBOOK ASSIGNMENTS: The TRAMAN for this course is *Aviation Structural Mechanic (H & S) 3 & 2*, NAVEDTRA 12338. The TRAMAN pages that you are to study are listed at the beginning of each assignment. Study these pages carefully before attempting to answer the questions in the course Pay close attention to tables and illustrations because they contain information that will help you understand the text. Read the learning objectives provided at the beginning of each chapter or topic in the text and/or preceding each set of questions in the course. Learning objectives state what you should be able to do after studying the material. Answering the questions correctly helps you accomplish the objectives,

BLACK DOT INFORMATION: Black dots (●) may be used in the text and correspondence course to emphasize important or supplemental information and to highlight instructions for answering certain questions. Read these black dot entries carefully; they will help you answer the questions and understand the material.

SELECTING YOUR ANSWERS: After studying the TRAMAN, you should be ready to answer the questions in the assignment. Read each question carefully, then select the BEST answer. Be sure to select your answer from the subject matter in the TRAMAN. You may refer freely to the TRAMAN and seek advice and information from others on problems that may arise in the course. However, the answers must be the result of your own work and decisions. You are prohibited from referring to or copying the answers of others and from giving answers to anyone else taking the same course. Failure to follow these rules can result in suspension from the course and disciplinary action.

SUBMITTING COMPLETED ANSWER SHEETS: Complete all assignments as quickly as possible to derive maximum benefit from the course. As a minimum, you must submit at least one assignment per month. This is a requirement established by the Chief of Naval Education and Training. Failure to meet this requirement could result in disenrollment from the course.

TYPES OF ANSWER SHEETS: If you are a U.S. Navy enlisted member on active duty or a drilling U.S. Naval Reserve enlisted member, you should use the answer sheet attached at the end of this course and follow the instructions in section A below. If you are an enlisted U.S. Naval Reserve member who is not attached to a drilling unit or if you are an officer, a civilian, or a member of the U.S. Army, Air Force, Marine Corps, or Coast Guard, you should use the Automatic Data Processing (ADP) answer sheets included in the course package and follow the instructions in section P.

A. Manually Scored Answer Sheets

If you are a U.S. Navy enlisted member on active duty or attached to a U. S. Naval Reserve drilling unit, your course will be administered by your local command. You must use the answer sheet designed for manual scoring, NETPMSA form 1430/5, Stock Ordering Number 0502-LP-216-0100. You may get a supply of the forms from your Educational Services Officer (ESO), or you may reproduce the one in the back of this course booklet. DO NOT USE THIS FORM FOR COURSES ADMINISTERED BY NETPMSA.

Recording Information on the Manually Scored Answer Sheets: As you complete each assignment, submit the completed answer sheet to your ESO for grading. You may submit more than one answer sheet at a time. Remember, you must submit at least one assignment each month.

Grading: Your ESO will grade each answer sheet and notify you of any incorrect answers. The passing score for each assignment is 3.2. If you receive less than 3.2 on any assignment, the ESO will list the questions you answered incorrectly and give you an answer sheet marked "RESUBMIT." You must redo the assignment and complete the RESUBMIT answer sheet. The maximum score you can receive for a resubmitted assignment is 3.2.

Course Completion: After you have submitted all the answer sheets and have earned at least 3.2 on each assignment, your command should give you credit for this course by making the appropriate entry in your service record.

Student Questions: If you have questions concerning the administration of this course, consult your ESO.

B. ADP Answer Sheets

If you are an enlisted U.S. Naval Reserve member who is not attached to a drilling reserve unit or if you are an officer, a civilian, or a member of the U.S. Army, Air Force, Marine Corps, or Coast Guard, use the ADP answer sheets provided in your course package. You should use one blank original ADP answer sheet for each assignment. Use only the original ADP answer sheet provided in your course package; NETPMSA will not accept reproductions.

Recording Information on the ADP Answer Sheets: Follow the "MARKING INSTRUCTIONS" on each answer sheet. Be sure that blocks 1, 2, and 3 are filled in correctly. This reformation is necessary for your course to be properly processed and for you to receive credit for your work.

As you work the course, be sure to mark your answers in the course booklet because your answer sheets will not be returned to you. When you have completed an assignment, transfer your answer from the course booklet to the answer sheet.

Mailing the Completed ADP Answer Sheets: Upon completing an assignment, mail the completed answer sheet to:

COMMANDING OFFICER
NETPMSA CODE 074
6490 SAUFLEY FIELD RD
PENSACOLA FL 32559-5000

Use envelopes to mail your answer sheets. You must provide your own envelopes or request them from your ESO. You may enclose more than one answer sheet in a single envelope. Remember, regardless of how many answer sheets you submit at a time, NETPMSA should receive at least one assignment a month.

NOTE: DO NOT USE THE COURSE COMMENTS PAGE AS AN ENVELOPE FOR RETURNING ANSWER SHEETS OR OTHER COURSE MATERIALS.

Grading: NETPMSA will grade the answer sheets and notify you by letter concerning your grade for each assignment, your incorrect answers, and your final grade. The passing score for each assignment is 3.2. If you receive less than 3.2 on any assignment, you must rework the assignment. NETPMSA will enclose a new ADP answer sheet in the letter notifying you of the questions you answered incorrectly. You will be required to redo the assignment and resubmit the new answer sheet. The maximum score you can receive for a resubmitted assignment is 3.2.

Course Completion: When you complete the last assignment, fill out the "Course Completion" form in the back of the course and enclose it with your last answer sheet. NETPMSA will issue you a letter certifying that you satisfactorily completed the course. You should make sure that credit for the course is recorded in your service record. YOU MAY RETAIN THE TEXT.

NOTE: YOUR OFFICIAL COURSE COMPLETION DATE WILL BE THE DATE YOUR LAST ASSIGNMENT IS PROCESSED THROUGH THE NETPMSA ADP SYSTEM--NOT THE DATE YOU DEPOSIT THE LAST ASSIGNMENT IN THE MAIL. This is especially important if you are taking the course for Naval Reserve retirement credit. You must mail your answer sheets at least 60 days before your anniversary date. This will provide you with enough time for delays in the mail or reworking failed assignments. DO NOT MAIL YOUR ASSIGNMENTS TO THE NAVAL RESERVE PERSONNEL COMMAND (NRPC).

Student Questions: Refer questions concerning this course to NETPMSA by mail (use the address on page ii) or by telephone: DSN 922-1366 or commercial (904) 452-1366.

NAVAL RESERVE RETIREMENT CREDIT

If you are a member of the Naval Reserve, you will receive retirement points if you are authorized to receive them under current directives governing retirement of Naval Reserve personnel. For the purpose of Naval Reserve retirement, this edition of the course is evaluated at **21** points. Those points will be credited as follows:

12 points for the satisfactory completion of assignments 1 through 8 and

9 points for the satisfactory completion of assignments 9 through 14.

NOTE: YOUR OFFICIAL COURSE COMPLETION DATE WILL BE THE DATE YOUR LAST ASSIGNMENT IS PROCESSED THROUGH THE NETPMSA ADP SYSTEM--NOT THE DATE YOU DEPOSIT THE LAST ASSIGNMENT IN THE MAIL. Refer to the Course Completion paragraph under section B. ADP Answer Sheets.

COURSE OBJECTIVES

In completing this NRTC, you will demonstrate a knowledge of the subject matter by correctly answering questions on the following: Aircraft construction and materials; aircraft hardware and seals; general aircraft maintenance; hydraulic contamination and related servicing/test equipment; hose fabrication and maintenance; tubing fabrication and maintenance; basic power systems; basic actuating systems; fixed-wing flight control systems; rotary-wing flight control systems; aircraft wheels, tires, and tubes; landing gear, brakes, and hydraulic utility systems; aircraft metallic repair; aircraft nonmetallic repair; and nondestructive inspections, welding, and heat treatment.

Naval courses may include several types of questions—multiple-choice, true-false, matching, etc. The questions are not grouped by type but by subject matter. They are presented in the same general sequence as the textbook material upon which they are based. This presentation is designed to preserve continuity of thought, permitting step-by-step development of ideas. Not all courses use all of the types of questions available. The student can readily identify the type of each question, and the action required, by inspection of the samples given below.

MULTIPLE-CHOICE QUESTIONS

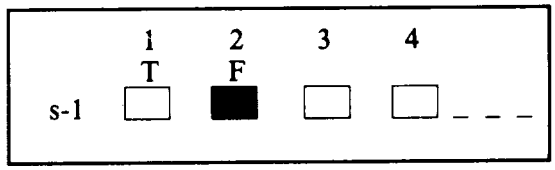
Each question contains several alternatives, one of which provides the best answer to the question. Select the best alternative, and blacken the appropriate box on the answer sheet.

SAMPLE

s-1. Who was the first person appointed Secretary of Defense under the National Security Act of 1947?

1. George Marshall
2. James Forrestal
3. Chester Nimitz
4. William Halsey

Indicate in this way on the answer sheet:



TRUE-FALSE QUESTIONS

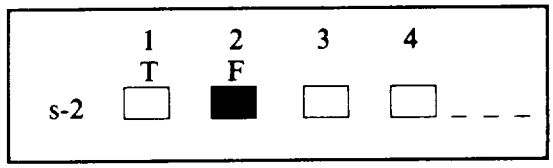
Mark each statement true or false as indicated below. If any part of the statement is false the statement is to be considered false. Make the decision, and blacken the appropriate box on the answer sheet.

SAMPLE

s-2. All naval officers are authorized to correspond officially with any systems command of the Department of the Navy without their respective commanding officer's endorsement.

1. True
2. False

Indicate in this way on the answer sheet:



MATCHING QUESTIONS

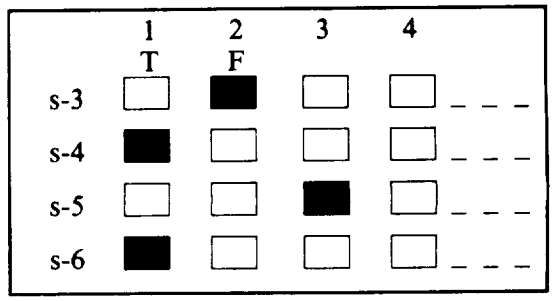
Each set of questions consists of two columns, each listing words, phrases or sentences. The task is to select the item in column B which is the best match for the item in column A that is being considered. Items in column B may be used once, more than once, or not at all. Specific instructions are given with each set of questions. Select the numbers identifying the answers and blacken the appropriate boxes on the answer sheet.

SAMPLE

In questions s-3 through s-6, match the name of the shipboard officer in column A by selecting from column B the name of the department in which the officer functions. Some responses may be used once, more than once, or not at all.

A. OFFICER	B. DEPARTMENT
s-3. Damage Control Assistant	1. Operations Department
s-4. CIC Officer	2. Engineering Department
s-5. Disbursing Officer	3. Supply Department
s-6. Communications Officer	

Indicate in this way on the answer sheet:



ASSIGNMENT 1

Textbook Assignment: "Aircraft Construction and Materials," chapter 1, pages 1-1 through 1-24.

1-1. The airframe of a fixed-wing aircraft is generally divided into what total number of principal units?

1. Five
2. Six
3. Seven
4. Eight

1-2. Which of the following is NOT a common design class of naval aircraft fuselages?

1. Monocoque
2. Semimonocoque
3. Reinforced shell
4. Welded steel truss

1-3. In a semimonocoque fuselage design, primary bending loads are absorbed by what structural member?

1. Bulkheads
2. Longerons
3. Station webs
4. Vertical rings

1-4. The shear load on a reinforced, shell-type fuselage is primarily carried by what structural component(s)?

1. The keel
2. The skin
3. The formers
4. The stringers

1-5. Where on an aircraft is fuselage station 0 (zero) usually located?

1. Directly below the pilot
2. Above the nose landing gear
3. Above the main landing gear
4. At or near the nose of the aircraft

1-6. Engine loads, stresses, and vibrations are transmitted to an aircraft structure by what parts?

1. Bulkheads
2. Mount beams
3. Engine mounts and nacelles
4. Stringers, formers, and frames

1-7. What are the principal structural metiers of a cantilever wing?

1. Spars
2. Rings
3. Formers
4. Stringers

1-8. The skin of a cantilever wing is fastened to which of the following structural components?

1. Ribs
2. Spars
3. Formers
4. All of the above

1-9. The load imposed on the wings during flight acts primarily on what structural member(s)?

1. Beams
2. Spars
3. Skin
4. Ribs

1-10. Where on an aircraft is wing station O (zero) located?

1. At the wing tip
2. At the wing butt
3. At the centerline of the fuselage
4. At the outboard edge of the center section

1-11. All aircraft stations are numbered in what units of measurement?

1. Feet
2. Inches
3. Meters
4. Centimeters

1-12. What is the primary function of the stabilizers?

1. To provide drag for the aircraft
2. To control the direction of flight
3. To balance the weight of the wings
4. To keep the aircraft flying straight and level

1-13. What airfoil maintains directional stability in an aircraft?

1. The rudder
2. The elevators
3. The vertical stabilizer
4. The horizontal stabilizer

1-14. Which of the following is a primary flight control?

1. Rudder
2. Spoiler
3. Trim tab
4. Wing flap

1-15. To roll an aircraft clockwise, you must cause which of the following changes in flight control positions?

1. Raise the left aileron and lower the right one
2. Lower the left aileron and raise the right one
3. Raise the elevators and move the rudder(s) to the left
4. Lower the elevators and move the rudder(s) to the right

1-16. The pilot of a fighter type aircraft has underestimated his altitude and must climb steeply to get over a mountain. Which of the following actions should he take?

1. Pull back on the yoke
2. Push the yoke forward
3. Push the stick forward
4. Pull back on the stick

1-17. Which of the following systems would assist the pilot of a high-speed aircraft in moving the control surfaces?

1. A torsion link
2. A compound link
3. A manual-boost system
4. A power-operated system

1-18. Longitudinal control systems control movement of the aircraft about which of the following axes?

1. Lateral only
2. Vertical only
3. Longitudinal only
4. Lateral, vertical, and longitudinal

1-19. A load-feel bungee in a lateral control system is NOT used for which of the following purposes?

1. Artificial feel
2. Control stick centering
3. Interconnects aileron systems
4. Automatic aileron trim control

1-20. When the control stick of an aircraft equipped with a flaperon system is moved to the left, the left and right flaperons will be in which of the following positions?

1. Left down, right up
2. Left up, right flush
3. Left down, right flush
4. Left flush, right down

1-21. An aircraft is equipped with a spoiler/deflector system. When the spoilers are set at 60 degrees, which of the following angles of deflection can NOT be achieved with the deflectors?

1. 35°
2. 30°
3. 25°
4. 20°

1-22. The actuator of the slab type horizontal stabilizer can operate in which of the following modes?

1. Manual or series only
2. Manual or parallel only
3. Manual, series, or parallel
4. Manual, series, or conductive

1-23. The yawing motion of an aircraft is controlled by what flight control(s) ?

1. Ailerons
2. Elevators
3. Rudder(s)
4. Trim tabs

1-24. On the F-14 aircraft, variable-geometry wings are used for what purpose?

1. To increase performance at all speeds
2. To increase the length of the wing
3. To change the angle of attack
4. To fold the wings

1-25. The mechanical mode of the F-14 wing sweep is used for which of the following purposes?

1. Normal landings
2. Normal takeoffs
3. Emergencies
4. Formation flying

1-26. Trim tabs are secondary flight control surfaces that are recessed into the trailing edges of which of the following components?

1. Wings
2. Vertical stabilizers
3. Horizontal stabilizers
4. Ailerons, elevators, and rudders

1-27. An aircraft's wing flaps are used for which of the following purposes?

1. To increase speed
2. To decrease speed
3. To help move the ailerons
4. To make the wings more rigid

1-28. Which of the following types of flaps operates on tracks and rollers?

1. Plain
2. Split
3. Fowler
4. Leading edge

1-29. A speed brake is used for which of the following purposes?

1. To increase lateral control
2. To decrease landing speed
3. To decrease thrust
4. To increase lift

1-30. A boundary layer control is used with which of the following secondary controls?

1. Slats
2. Trim tabs
3. Speed brakes
4. Aileron droop

1-31. A conventional landing gear includes which of the following arrangements?

1. Two main and one tail wheel
2. Two main and one nosewheel
3. Two main wheels and a tail skid
4. Two outboard floats and a center hull

1-32. During strut compression, fluid passes through an orifice into what chamber of an air-oil type shock strut?

1. Aft
2. Upper
3. Lowe r
4. Forward

1-33. What part of an air-oil shock strut controls the rate of flow of the fluid between the piston and cylinder?

1. The torque arm
2. The metering pin
3. The orifice plate
4. The snubber orifice

1-34. Instructions for servicing shock struts can be found in which of the following places?

1. In the IPB
2. In the PMIC
3. On an instruction plate attached to the strut
4. On a plate attached to the under side of the port wing

1-35. On most aircraft, the landing gear is actuated by what system?

1. Gravity
2. Pneumatic
3. Hydraulic
4. Electrical

1-36. The shimmy damper on a nose landing gear assembly prevents the nosewheel from shimmying during takeoff and landing by what means?

1. By actuating a low-ratio gear train
2. By forcing a rotary bar to move against a friction plate
3. By accentuating sudden torque loads applied to the nosewheel
4. By metering hydraulic fluid through a small orifice between two cylinders or chambers

1-37. What component is used to hold the arresting hook in the down position to prevent it from bouncing when it strikes the carrier deck?

1. A snubber
2. A drag link
3. A cable assembly
4. A liquid centering spring

1-38. When comparing catapult hookup methods on a carrier, the nose gear launch method is superior to the bridle method for all EXCEPT which of the following reasons?

1. It saves time
2. It costs less to operate
3. It requires fewer personnel
4. It is the safest method

1-39. The fundamental advantage of the helicopter over the conventional aircraft is its ability to move independent of forward speed.

1. True
2. False

1-40. Which of the following helicopter components provides lift?

1. The engines
2. The fuselage
3. The tail rotor
4. The rotor blades

1-41. The fuselage of an H-3 helicopter is of what type of construction?

1. Monocoque
2. Semimonocoque
3. Reinforced shell
4. Welded steel truss

1-42. Which of the following terms is NOT associated with the movement of helicopter rotor blades?

1. Lag
2. Lead
3. Flip
4. Flap

1-43. Rotor blade movement in relationship to the hub is limited by what component(s)?

1. The hinges
2. The gearbox
3. The transmission
4. The pitch control beam

1-44. What rotor blade component is NOT made of aluminum alloy?

1. cuff
2. Spar
3. Tip cap
4. Tip pocket

1-45. The resistance to stretching of an object produced by two forces pulling in opposite directions along the same straight line is known as what type of stress?

1. Shear
2. Bending
3. Torsion
4. Tension

1-46. When in flight, the wing spars of an aircraft-undergo bending stresses. These stresses are actually a combination of what other stresses?

1. Shear and tension
2. Bending and torsion
3. Compression and tension
4. Shear, torsion, and compression

1-47. When an aircraft is operating, which of the following components is subject to torsional stresses?

1. A shock strut
2. A tailhook shank
3. A propeller shaft
4. A reservoir piston

1-48. What is the world’s lightest structural metal?

1. Steel
2. Titanium
3. Aluminum
4. Magnesium

1-49. What is the largest portion of metal present in an alloy?

1. Main metal
2. Base metal
3. Foundation metal
4. Major component metal

1-50. The core material of reinforced plastic consists of a honeycomb structure.

1. True
2. False

1-51. The strength of all metals is closely related to what other characteristic?

1. Hardness
2. Denseness
3. Brittleness
4. Conductivity

1-52. Metals possessing which of the following properties should NOT be used in aircraft structures?

1. Ductility
2. Elasticity
3. Brittleness
4. Contraction

1-53. What metallic property is necessary for sheet metal used in wing tip construction?

1. Conductivity
2. Malleability
3. Fusibility
4. Ductility

1-54. The making of tubing and wire requires the use of metals that possess which of the following properties?

1. Toughness
2. Ductility
3. Conductivity
4. Contraction and expansion

1-55. When a metallic part is designed for an aircraft, particular attention must be given to what property of metal in order to maintain the proper weight and balance of the aircraft?

1. Malleability
2. Toughness
3. Hardness
4. Density

1-56. Metals to be used in welding must contain which of the following properties?

1. Elasticity and density
2. Toughness and brittleness
3. Hardness and malleability
4. Conductivity and fusibility

1-57. In determining the most suitable material for airframe construction and repair, you should consider which of the following qualities?

1. Weight
2. Strength
3. Reliability
4. All of the above

1-58. What general properties of metals are directly affected by cold-working?

1. Elasticity and density
2. Hardness and brittleness
3. Malleability and fusibility
4. Fusibility, hardness, and density

ASSIGNMENT 2

Textbook Assignment: "Aircraft Construction and Materials," chapter 1, pages 1-24 through 1-44.

2-1. The amount of cold-working a metal can withstand is directly related to which of the following properties?

1. Density and elasticity
2. Toughness and fusibility
3. Malleability and ductility
4. Contraction, expansion, and conductivity

2-2. When all other metal properties are equal, what method of joining metals structurally has the greatest advantage in design and fabrication?

1. Welding
2. Brazing
3. Riveting
4. Soldering

2-3. What are the three basic methods of metal working?

1. Cold-working, hot-working, and forging
2. Hot-working, cold-working, and rolling
3. Hot-working, cold-working, and extruding
4. Cold-working, hot–working, and hot-rolling

2-4. The intermediate shape of steel that has width greater than twice the thickness and from which sheets are rolled is known by what name?

1. Slab
2. Bloom
3. Ingot
4. Billet

2-5. What method of metal working will give the best possible structure throughout the metal?

1. Pressing
2. Extruding
3. Cold-rolling
4. Smith forging

2-6. What effect does cold-working have upon the ductility, elasticity, and hardness of a metal?

1. All are decreased
2. All are increased
3. Ductility is decreased; elasticity and hardness are increased
4. Ductility and elasticity are increased; hardness is decreased

2-7. What metal working process is used to make wire?

1. Pressing
2. Extruding
3. Hammering
4. Cold-drawing

2-8. The process of dipping steel in an acid to remove scale is known by what name?

1. Pickling
2. Tempering
3. Quenching
4. Annealing

2-9. Which of the following aircraft parts are made by the extrusion process?

1. Cables
2. Stringers
3. Control rods
4. Seamed tubing

2-10. An alloying agent can change which of the following base metal characteristics?

1. Strength
2. Corrosion resistance
3. Electrical conductivity
4. All of the above

2-11. A ferrous metal has what type of metal as its principal component?

1. Lead
2. Iron
3. Nickel
4. Aluminum

IN ANSWERING QUESTION 2-12, REFER TO TABLE 1-1 IN THE TEXTBOOK.

2-12. What is the type and composition of SAE 5135 steel?

1. Nickel steel, 5-percent nickel and 13.5-percent carbon
2. Chromium steel, l-percent chromium and 0.35-percent carbon
3. Chromium steel, 13-percent carbon and 0.5-percent chromium
4. Nickel steel, 5-percent steel, l-percent nickel, and 0.35-percent carbon

2-13. While holding a piece of metal against a revolving stone, you see red sparks leave the stone and turn to straw color. This is what type of metal?

1. Low-carbon steel
2. Nickel steel
3. Wrought iron
4. Cast iron

IN ANSWERING QUESTIONS 2-14 THROUGH 2-17, SELECT FROM COLUMN B THE TYPE OF STEEL USED IN THE ITEM LISTED IN COLUMN A.

A. ITEMS	B, TYPES OF STEEL
2-14. Bolts	1. Nickel steel
2-15. Safety wire	2. Chromium steel
2-16. Coil springs	3. Low-carbon steel
2-17. Antifriction ball bearings	4. High-carbon steel

2-18. What is the prime characteristic of aluminum?

1. Lightweight
2. Low melting point
3. Ease of fabrication
4. Corrosion-resistant properties

2-19. Which of the following processes of joining aluminum alloys produces the strongest joints?

1. Brazing
2. Forging
3. Riveting
4. Heat treating

2-20. Which of the following statements is correct concerning an aluminum sheet designated 1075?

1. It is 99.75 percent aluminum
2. It contains 0.75 percent carbon
3. It is alloyed with nickel
4. It is pure aluminum with a modification in impurities

IN ANSWERING QUESTIONS 2-21 AND 2-22, REFER TO TABLE 1-2 IN THE TEXTBOOK.

2-21. What is the principal alloying element of aluminum alloy 2024?

1. Zinc
2. Copper
3. Manganese
4. Magnesium

2-22. An aluminum alloy containing manganese as the major alloying element is identified by what number?

1. 1035
2. 2014
3. 3003
4. 7010

2-23. An aluminum alloy that is fully heat treated will have what letter designation?

1. F
2. H
3. 0
4. T

2-24. Which of the following aluminum alloys should be used when the highest strength is required?

1. 1100
2. 2014
3. 5052
4. 7178

2-25. Alclad is an aluminum alloy with a protective coating of what material?

1. Manganese
2. Pure aluminum
3. Zinc chromate
4. Aluminum oxide

2-26. In the aluminum alloy designation A355-T51, what does the prefix A indicate?

1. The heat treatment
2. The type of casting
3. The composition of the casting
4. The original alloy composition was variated slightly

2-27. What methods are used to join heat-treatable aluminum alloys?

1. All welding methods
2. Spot welding and riveting only
3. Fusion welding and bolting only
4. Spot welding, fusion welding, riveting, and bolting

2-28. What is the greatest disadvantage in the use of titanium?

1. Strength-to-weight ratio
2. Tendency to crack when cold-worked
3. Tendency to back away from or resist the cutting edge of tools
4. Brittleness after long exposure to temperatures above 1000°F

2-29. If you hold a piece of titanium against a revolving grinding wheel, what color sparks will be produced?

1. Red spark traces that end in straw colored bursts
2. White spark traces that end in straw colored bursts
3. Red spark traces that end in brilliant white bursts
4. White spark traces that end in brilliant white bursts

2-30. The use of copper as a structural material is limited because of which of the following factors?

1. Cost
2. Great weight
3. High heat conductivity
4. High electrical conductivity

2-31. Because copper is very ductile and malleable, it is ideal for making electrical wire.

1. True
2. False

2-32. What is the principal element added to copper to form brass?

1. Tin
2. Lead
3. Zinc
4. Aluminum

2-33. Which of the following bronze alloys has high strength and great corrosion resistance but is NOT a true bronze because it contains a small amount of tin?

1. Silicon bronze
2. Manganese bronze
3. Cast aluminum bronze
4. Wrought aluminum bronze

2-34. Which of the following statements regarding Monel is NOT correct?

1. Monel is classified among the tough metals
2. Monel's base metal is nickel and its principal alloying element is copper
3. Monel's tensile strength can be increased to a great degree by heat treatment
4. Monel is used for aircraft parts demanding both strength and resistance to corrosion

2-35. If a block of aluminum weighs 6 pounds, a block of magnesium having the same dimensions would be what weight?

1. 6 pounds
2. 2 pounds
3. 8 pounds
4. 4 pounds

2-36. One of the major problems with using magnesium in aircraft construction is its short supply in the world.

1. True
2. False

2-37. Which of the following extinguishing agents should be used on a magnesium fire?

1. Graphite powder
2. Carbon dioxide
3. Water
4. Foam

IN ANSWERING QUESTION 2-38, REFER TO TABLE 1-3 IN THE TEXTBOOK.

2-38. You are testing a piece of steel on the Brinell tester and find the diameter of the ball impression to be 2.35 mm. What is the hardness number for this material?

1. 114
2. 124
3. 682
4. 745

2-39. Which of the following penetrators are used with the Rockwell hardness tester?

1. Flanged head and truncated cone
2. Spiral point and steel ball
3. Diamond cone and steel ball
4. Diamond tip and spiral rod

IN ANSWERING QUESTIONS 2-40 THROUGH 2-42, REFER TO TABLE 1-4 IN THE TEXTBOOK.

2-40. You are testing a piece of steel on the Rockwell tester using the diamond penetrator and both weights. If the reading is 40 on the black scale and 70 on the red scale, what is the hardness number?

1. C-40
2. C-70
3. D-40
4. D-70

2-41. When the Rockwell hardness tester is being used, the black dial numbers should be read only when what scale or penetrator is used?

1. E scale
2. F scale
3. Diamond penetrator
4. l/16-inch ball penetrator

2-42. In what way should the pan be weighed when making a G scale test on the Rockwell hardness tester?

1. With the red weight only
2. With the black weight only
3. With both the red and black weights
4. Without either the red or black weight

2-43. When testing a metal of completely unknown hardness on a Riehle hardness tester, a preliminary reading should be taken on what scale as a guide in selecting the proper scale to be used?

1. A
2. B
3. F
4. G

IN ANSWERING QUESTION 2-44, REFER TO TABLE 1-5 IN THE TEXTBOOK.

2-44. Which of the following aluminum alloys is the hardest?

1. 3003-0
2. 3003-1/2H
3. 5052-1/2H
4. 6061-T

2-45. You check the condition of the point of the Barcol tester by using the test disc and find the indicator reading is NOT within the specified range. You should correct this condition by first following what procedure?

1. Grind the point
2. Install a new point
3. Adjust the lower plunger guide
4. Adjust the plunger upper guide nut

2-46. When an Ernst hardness tester is used, a direct reading from which of the following scales should NOT be used?

1. Brinell scales
2. Rockwell A scale
3. Rockwell B scale
4. Rockwell C scale

2-47. The canopies of most high-speed naval aircraft are made of what material?

1. Stretched acrylic plastic
2. Laminated acrylic plastic
3. Laminated thermoplastic
4. Thermoshield

2-48. When viewed from its edge, which of the following plastics is practically clear?

1. Heat-resistant acrylic
2. Craze-resistant acrylic
3. Thermosetting polyester
4. Heat-resistant polyester

2-49. You can distinguish a plastic enclosure from a glass enclosure by using which of the following methods?

1. Checking for a nonringing sound while tapping lightly
2. Checking the ease with which it is drilled
3. Checking its reaction to acetone
4. Checking its reaction to hexane

2-50. Relative to handling and storage of sheets of plastic, which of the following statements is NOT correct?

1. Plastic sheets should be stored in bins that are tilted away from the vertical
2. Plastic sheets should be stored in a cool, ventilated area in order to reduce the potential fire hazard
3. If the plastic sheets are stored horizontally, the smaller sheets should be stacked upon the larger ones
4. If the plastic sheets are placed on a table prior to shaping, the table must be cleaned thoroughly

2-51. If long or improper storage has caused the adhesive to deteriorate on a sheet of plastic, the masking paper should be moistened with what chemical?

1. Ether
2. Xylene
3. Glass cleaner
4. Aliphatic naphtha

2-52. What primary characteristic makes reinforced plastic a particularly ideal material from which to construct radomes?

1. Dielectric property
2. Ease of fabrication
3. High strength/weight ratio
4. Resistance to mildew and rot

2-53. Which of the following resins are thick, syrupy liquids used in the manufacture of reinforced plastic?

1. Pressure resin
2. Heat-pressure resin
3. Contact-pressure resin
4. Noncontact-pressure resin

2-54. In various aircraft structural components, which of the following materials is replacing and supplementing metallic materials?

1. Rubber material
2. Plastic material
3. Sandwich material
4. Composite material

2-55. Numerous combinations of composite materials are being studied and used, but because of cost, the trend is toward a minimum use of which of the following materials?

1. Boron/epoxy
2. Kevlar®/epoxy
3. Aluminum/epoxy
4. Graphite/epoxy

2-56. Advanced composites have given composite materials structural properties superior to the metal alloys they have replaced?

1. True
2. False

2-57. What are the two broad classes of sandwich components?

1. Radomes and doors
2. Stabilizer and radomes
3. Radomes and structural
4. Stabilizer and trim tabs

ASSIGNMENT 3

Textbook Assignment: "Aircraft Hardware and Seals," chapter 2, pages 2-1 through 2-46.

3-1. Which of the following is NOT a factor in the classification of solid rivets?

1. Size
2. Color
3. Material
4. Head shape

IN ANSWERING QUESTION 3-2, REFER TO FIGURE 2-1 IN THE TEXTBOOK.

3-2. A rivet with the code number MS 20426 has what type of rivet head?

1. Flat
2. Round
3. Universal
4. Countersunk

IN ANSWERING QUESTIONS 3-3 THROUGH 3-5, REFER TO FIGURE 2-2 IN YOUR TEXTBOOK. SELECT FROM COLUMN B THE MEANINGS OF THE CODES IN COLUMN A. NOT ALL ITEMS IN COLUMN B WILL BE USED.

A. CODES	B. MEANINGS
3-3. AD	1. Material or alloy
3-4. 5	2. Length in sixteenths of an inch
3-5. 8	3. Diameter in thirty-seconds of an inch
	4. Head shape

3-6. Which of the following codes identifies a rivet with a plain head marking?

1. 1100-F
2. 2017-T4
3. 2024-T4
4. 2117-T4

3-7. Relative to the heat-treatment characteristics of 2017 and 2024 aluminum alloy rivets, which of the following statements is NOT correct?

1. The rivets are supplied in the T4 temper and must be heat treated prior to use
2. If not refrigerated, these rivets must be driven within 20 minutes after quenching
3. These rivets may be reheated as many times as required provided the proper solution heat-treatment temperature is not exceeded
4. If refrigerated at 32°F or lower immediately after quenching, these rivets may be stored under refrigeration indefinitely and require no further heat treatment prior to use

3-8. Rivets used primarily for joining magnesium alloy structures have what alloy designation?

1. 1100
2. 5056
3. 2017-T4
4. 2117-T4

3-9. Which of the following precautions should you take when using hi-shear (pin) rivets?

1. Never use them on thick sheets
2. Never use them on aluminum alloys
3. Never use them with an aluminum collar
4. Never use them where the grip length is less than the shank diameter

3-10. When space on one side is too restricted to properly use a bucking bar, what type of rivet should you use?

1. Flat
2. Solid
3. Blind
4. Hi-shear

3-11. What type of rivnut must be used on sealed flotation or pressurized compartments?

1. Open-end
2. Closed-end
3. Groove shanked
4. Externally threaded

3-12. Which of the following fasteners has a shear and tensile strength at least equal to the requirements of AN and NAS bolts?

1. Lock-bolt
2. Turnlock
3. Rivnut
4. Airloc

3-13. What metal is used in the construction of the threaded pins of hi-lok fasteners?

1. Titanium
2. Stainless steel
3. Anodized 2024-T6 aluminum
4. Cadmium-plated alloy steel

3-14. Which of the following is NOT a head style of jo-bolts?

1. 100-degree flush head
2. Diamond recessed head
3. Hexagon protruding head
4. 100-degree flush millable head

3-15. The 4002 series Camloc fastener consists of what total number of principal parts?

1. 1 part
2. 2 parts
3. 3 parts
4. 4 parts

3-16. What distance will the stud of a Camloc fastener have to be turned to release it but not far enough to permit re-engagement?

1. One-half turn clockwise
2. One-fourth turn clockwise
3. One-half turn counterclockwise
4. One-fourth turn counterclockwise

3-17. What are the two types of Airloc receptacles?

1. Fixed and floating
2. Fixed and flying
3. Set and flying
4. Fixed and set

3-18. Which of the following parts is used only on heavy-duty Dzus fasteners?

1. A pin
2. A stud
3. A spring
4. A grommet

3-19. When you install a hose between two duct sections, what is the maximum allowable gap between the duct ends?

1. 1/4 inch
2. 3/8 inch
3. 3/4 inch
4. 7/8 inch

3-20. If the correct torque value is not specified on a Marman clamp, which of the following publications should you consult to locate the correct torque value?

1. IPB
2. NATOPS
3. Maintenance instruction manual
4. General structural repair manual

3-21. A V-band coupling requires what minimum number of turns of safety wire?

1. One
2. Two
3. Three
4. Four

3-22. A flat-head pin used in a tie rod terminal should be secured with what device?

1. A cotter pin
2. A sheet spring nut
3. A self-locking nut
4. A piece of safety wire

3-23. A replacement bolt is considered the correct length if at least one thread is extending through the nut?

1. True
2. False

3-24. An Allen wrench is required to tighten or loosen which of the following types of bolts?

1. Countersunk-head
2. Hex head
3. Clevis
4. Eye

3-25. Hi-torque bolts are installed with what tool?

1. An Allen wrench
2. A socket wrench
3. A special driver adapter
4. A Reed-and-Prince screwdriver

IN ANSWERING QUESTIONS 3-26 THROUGH 3-28, SELECT FROM COLUMN B THE STATEMENTS THAT EXPLAIN THE LETTERS OR NUMBERS OF THE BOLT DESIGNATION AN4CH-20 LISTED IN COLUMN A. NOT ALL ITEMS IN COLUMN B WILL BE USED.

A. LETTERS/ NUMBERS	B. STATEMENTS
3-26. 4	1. The bolt is 2 1/32 in. long
3-27. C	
3-28. H	2. The bolt diameter is 1/4 inch
	3. The bolt head is drilled for safetying
	4. The bolt is made of corrosion-resistant steel

3-29. Aircraft nuts are divided into what two general groups?

1. Self-1ocking and nonself-locking
2. Metal insert and fiber insert
3. High temperature and common
4. Ferrous and nonferrous

3-30. Which of the following is an example of an all-metal self-locking nut?

1. A wing nut
2. A flexloc nut
3. An elastic stop nut
4. An internal-wrenching nut

3-31. Which of the following types of nuts are designed to be used with cotter pins or safety wire?

1. Check nuts
2. Plate nuts
3. Castle nuts
4. Barrel nuts

3-32. When an assembly is frequently removed, which of the following types of nuts should be used?

1. Wing nuts
2. Shear nuts
3. Klincher locknuts
4. Sheet spring nuts

3-33. Which of the following types of nuts are used to ensure a permanent and vibrationproof connection?

1. Wing nuts
2. Shear nuts
3. Klincher locknuts
4. Sheet spring nuts

3-34. What three types of screws are most commonly used in aircraft construction?

1. Machine, structural, and self-tapping screws
2. Brazier-head, round-head, and common screws
3. Self-tapping, Phillips, and common screws
4. Structural, machine, and pan-head screws

3-35. Which of the following types of screws are as strong as bolts of the same size?

1. Setscrews
2. Machine screws
3. Structural screws
4. Self-tapping screws

3-36. Flush-head machine screws are available in what degree(s) of head angle?

1. 82° only
2. 82° and 100° only
3. 82°, 100°, and 125° only
4. 82°, 100°, 125°, and 145°

3-37. When replacing an original screw in a structure, you should NOT use which of the following screws?

1. A setscrew
2. A machine screw
3. A structural screw
4. A self-tapping screw

3-38. You should use ball socket and seat washers in which of the following situations?

1. With studs
2. Under taper pin nuts
3. With sheet spring nuts
4. When bolts are installed at an angle to the surface

3-39. Aircraft cables have the center core twisted in one direction and the outer core in the opposite direction for what reason?

1. To make the cable rigid
2. To make the cable stiffer
3. To minimize stretch or set
4. To allow the strands to expand when cut

3-40. A piece of 7 x 19 cable has what total number of wires?

1. 133 wires
2. 26 wires
3. 19 wires
4. 7 wires

3-41. Terminal fittings are generally attached to the ends of cables by what method?

1. Swaging
2. Welding
3. Splicing
4. Soldering

3-42. What type of fitting is used to connect a cable to a quadrant where space is limited?

1. Eye end
2. Fork end
3. Ball end
4. Threaded end

3-43. A turnbuckle barrel with internal left-hand threads can be identified by what means?

1. By the length of the barrel
2. By the letter L stamped on it
3. By a groove or a knurl around it
4. By its plain end with no identifying marks

IN ANSWERING QUESTION 3-44, REFER TO FIGURE 2-36 IN THE TEXTBOOK.

3-44. What is the total thread tolerance for a turnbuckle assembly?

1. 10 threads
2. 7 threads
3. 5 threads
4. 4 threads

3-45. For small openings where a single cable passes through a wall separating unpressurized compartments, what type of cable guide should you use?

1. Grommet
2. Pressure seal
3. Split fairlead
4. Solid fairlead

3-46. The purpose of quick-disconnect couplings is to provide a means of quickly disconnecting a line without having to contend with which of the following problems?

1. System pressure surges
2. Loss of hydraulic fluid only
3. Entrance of air into the system only
4. Loss of hydraulic fluid or entrance of air into the system

3-47. What half of series 145 and 155 (Aeroquip) couplings has mounting flanges used for attaching them to a bulkhead or other structural members of the aircraft?

1. S1
2. S2
3. S3
4. S4

3-48. The protruding nose of the series 145 and 155 (Aeroquip) coupling S4 half engages with what component to provide a positive seal?

1. Sleeve
2. O-ring
3. Poppet valve
4. Tubular valve

3-49. Which, if any, of the following types of quick-disconnect fittings allows the use of a wrench to assist in tightening the coupling?

1. Series 3200 quick disconnects
2. All series 145 and 155 quick disconnects
3. Modified series 145 and 155 quick disconnects
4. None of the above

3-50. The hydraulic seals used between nonmoving fittings and bosses are known by which of the following terms?

1. Gaskets
2. O-rings
3. Packings
4. Backup rings

3-51. What O-rings are replacing the AN6227 and AN6230 O-rings?

1. AN6290 O-rings
2. MS28775 O-rings
3. MS28777 O-rings
4. MS28778 O-rings

3-52. What type of rings are used with the MS28775 packing in most modern aircraft with hydraulic system pressures up to 3,000 psi?

1. O-rings
2. U-rings
3. V-rings
4. Backup rings

3-53. O-rings identified by colored dots, dashes, or stripes are only authorized for use on aircraft hydraulic systems that have less than 1,500 psi operating pressure?

1. True
2. False

3-54. O-ring age is computed by what means?

1. From the cure date
2. From the service life
3. From the replacement schedules
4. From the operational conditions

3-55. A torn O-ring package should be secured with which of the following materials?

1. Staples
2. Moistureproof glue
3. Pressure-sensitive, moisture-proof tape
4. Hermetically sealed, heatproof barrier paper

3-56. Which of the following materials should NOT be used to fabricate tools for use in replacing and installing O-rings and backup rings?

1. Wood
2. Steel
3. Brass
4. Phenolic rod

3-57. What method should you use to inspect the inner diameter of an O-ring for cracks?

1. Perform NDI
2. Use a small mirror
3. Roll it onto an inspection cone or dowel
4. Stretch it between two fingers and visually examine it

3-58. When an O-ring installation requires spanning or inserting through sharp threaded areas, ridges, slots, and edges, which of the following devices or procedures should you use?

1. O-ring expanders
2. O-ring entering sleeves
3. A rolling motion of the O-ring
4. Light coating of threads with MIL-S-8802

3-59. What are the two types of backup rings used in naval aircraft?

1. Teflon® single and double spiral
2. Leather and polyvinyl
3. O-ring and V-ring
4. Flat and parallel

3-60. What is the specified shelf life, if any, of Teflon® backup rings?

1. 1 year
2. 2 years
3. 3 years
4. None

3-61. Teflon® backup rings are identified by which of the following means?

1. Color coding
2. Coded symbols
3. Package labels
4. Visual appearance

3-62. When you installing Teflon® spiral rings in an internal groove, you must use a right-hand spiral.

1. True
2. False

3-63. A metallic wiper is installed in what position?

1. The lip facing inward
2. The lip facing outward
3. The groove facing inward
4. The groove facing outward

3-64. Which of the following protective closures are approved for sealing hydraulic equipment?

1. Metal caps only
2. Metal caps and plugs only
3. Plastic caps and plugs only
4. Plastic or metal caps and plugs

3-65. Devices that are attached to the ends of wires and cables to make them easier to connect or disconnect are known by which of the following terms?

1. Splices
2. Terminals
3. Connectors
4. Bonding straps

3-66. Annealed copper safety wire may be used on which of the following equipment?

1. Turnbuckles
2. First aid kits
3. Landing gear hardware
4. Flight control hardware

3-67. What is the preferred method for safetying turnbuckles?

1. Single-wire
2. Double-wire
3. Clip-locking
4. Wire-wrapping

ASSIGNMENT 4

Textbook Assignment: "General Aircraft Maintenance," chapter 3, pages 3-1 through 3-50.

4-1. The Navy's Tool Control Program is based on what concept?

1. Instant inventory
2. Cost effectiveness
3. Personal accountability
4. Tool replacement demands

4-2. Ensuring that tools are procured and issued in a controlled manner consistent with the approved tool control plan is the responsibility of what officer?

1. The maintenance officer
2. The material control officer
3. The quality assurance officer
4. The assistant maintenance officer

4-3. Which of the following reports should be used to report poor quality tools to FLEMATSUPPO?

1. EI
2. HMR
3. CAT I QDR
4. CAT II QDR

4-4. Upon task assignment, you must record the tool container number on what copy of the VIDS/MAF?

1. Copy 1
2. Copy 2
3. Copy 3
4. Copy 5

4-5. What person is responsible for training work center personnel in the use of a material safety data sheet (MSDS)?

1. The safety officer
2. The executive officer
3. The work center supervisor
4. The maintenance control Chief

4-6. To indicate a hazard that could result in injury or death to personnel if not carefully observed or followed, what safety term is used?

1. Memo
2. Note
3. Warning
4. Caution

IN ANSWERING QUESTIONS 4-7 AND 4-8, REFER TO FIGURE 3-3 IN THE TEXTBOOK.

4-7. Thin lines made up of long and short dashes alternately spaced and consistent in length are known by what name?

1. Hidden lines
2. Center lines
3. Dimension lines
4. Extension lines

4-8. Thin lines terminated with arrow heads at each end are known by what name?

1. Hidden lines
2. Leader lines
3. Extension lines
4. Dimension lines

IN ANSWERING QUESTIONS 4-9 THROUGH 4-13, SELECT FROM COLUMN B THE TYPE OF DRAWING OR DIAGRAM APPROPRIATE FOR THE USE LISTED IN COLUMN A.

	A. USES	B. TYPES
4-9.	Shows an exploded view	1. Block diagram
4-10.	Illustrates a system	2. Schematic diagram
4-11.	Shows disassembly	3. Pictorial drawing
4-12.	Shows the sequence in which the different components operate	4. Ortho-graphic drawing
4-13.	Shows detail of parts, components, and other objects; used primarily by the manufacturer	

4-14. A graphic representation that shows how a component fits with other components of a system but does not tell where it is in the aircraft is known as what type of diagram or drawing?

1. Schematic diagram
2. Pictorial drawing
3. Installation diagram
4. Orthographic drawing

4-15. Efficient troubleshooting of an electrically controlled hydraulic system may require you to use a multimeter for which of the following reasons?

1. To check frequency
2. To check voltage and continuity
3. To relieve the AE of solving electrical problems
4. To read the electrical portion of a schematic

4-16. After conducting a visual inspection and an operational check, what troubleshooting step should you perform next?

1. Locate the trouble
2. Isolate the trouble
3. Correct the trouble
4. Classify the trouble

4-17. You are troubleshooting a malfunction and conducting the final operational check. What is the minimum number of times the affected system must be actuated?

1. Five
2. Seven
3. Three
4. Four

4-18. When performing an operational check, which of the following actions should you complete before applying external hydraulic and electrical power?

1. Remove all safety locks
2. Install all ground covers
3. Return all flight controls to their neutral position
4. Check all circuit breakers and electrical switches for proper position

4-19. Which of the following maintenance malpractice causes fatigue failure in fasteners?

1. Overtorquing
2. Undertorquing
3. Improper heat treatment
4. Improper protective coating

4-20. You can find separate torque tables and torquing considerations in which of the following manuals?

1. NAVAIR 01-1A-8
2. NAVAIR 01-1A-17
3. NAVAIR 01-1A-500
4. NAVAIR 01-1A-509

4-21. Lubricants are NOT used for which of the following purposes?

1. To cool metallic parts
2. To protect metallic parts against wear
3. To protect metallic parts against corrosion
4. To increase friction when metal surfaces are in direct contact

IN ANSWERING QUESTIONS 4-22 AND 4-23, REFER TO TABLE 3-5 IN THE TEXTBOOK.

4-22. What is the recommended temperature range for MIL-G-21164?

1. 32° to 200°F
2. -65° to 160°F
3. -65° to 350°F
4. -100° to 250°F

4-23. To lubricate wheel bearings on internal brake assemblies, what type of grease should you use?

1. MIL-G-4343
2. MIL-G-23827
3. MIL-G-81322
4. MIL-G-25013

4-24. What total number of common methods are used to apply lubricants?

1. One
2. Two
3. Three
4. Four

4-25. Flush lubrication fittings are used for which of the following reasons?

1. To prevent interference with moving parts
2. To reach areas that are normally easy to access
3. To reach areas that are normally hard to access
4. To lubricate areas that do not require much lubrication

4-26. To determine the type of lubricant and equipment to be used in a given area of an aircraft, you should refer to which of the following publications?

1. MIMs
2. MRCs
3. Either 1 or 2 above
4. OPNAVINST 4790.2 (series)

4-27. To find the basic weight of an aircraft, you should refer to which of the following publications?

1. NAVAIR 01-1A-40
2. NAVAIR 01-1B-40
3. NAVAIR 01-1A-50
4. NAVAIR 01-1B-50

4-28. What type of aircraft weighing equipment has become the standard used by the Navy?

1. The mobile electronic weighing system
2. The heavy-duty portable scales
3. The stationary pit-type scales
4. The electronic load cells

4-29. Typically, a mobile electronic weighing system can be set up by two men in what minimum number of minutes?

1. 10 min
2. 15 min
3. 20 min
4. 30 min

4-30. Heavy-duty portable scales must be calibrated at least how often?

1. Prior to use
2. Once every 6 months
3. Twice every 6 months
4. Once every 12 months

4-31. Which of the following components is NOT normally a part of a weighing kit?

1. A plumb bob
2. A chalk line
3. A hydrometer
4. A spirit level

4-32. Before using an electronic scale, you must warm it up for what minimum number of minutes?

1. 5 min
2. 10 min
3. 20 min
4. 30 min

4-33. After removing an aircraft from the scales, you must reweigh it if the scale does NOT return to zero within what number of minutes?

1. 5 min
2. 10 min
3. 15 min
4. 20 min

4-34. Which of the following is NOT a type of aircraft lifting sling?

1. Wire rope
2. Snatch cable
3. Fabric webbing
4. Structural steel

4-35. What is the most common type of aircraft lifting sling?

1. Web sling
2. Chain sling
3. Wire rope sling
4. Structural aluminum sling

4-36. Which of the following types of lifting slings do NOT contain flexible components?

1. Wire slings
2. Chair slings
3. Fabric slings
4. Structural steel slings

4-37. To find load testing and inspection information on aircraft lifting slings, you should consult what publication?

1. NAVAIR 01-1A-17
2. NAVAIR 01-1A-20
3. NAVAIR 17-1-114
4. NAVAIR 17-15E-52

4-38. When a lifting sling’s capacity has been exceeded, which of the following actions should you take?

1. Forward it to AIMD for analysis and disposition
2. Use it once more, and then forward it to AIMD
3. Send it to the organizational unit for analysis and disposition
4. Retain it until the next time it is required, and then forward it to AIMD for inspection

4-39. A group of wires twisted together is known by what name?

1. A wire rope
2. A strand
3. A cable
4. A core

4-40. In reference to a cable, what does the term “bird cage” mean?

1. A kink that has been pulled through in order to straighten a cable
2. A cable that is manufactured to look like a bird cage
3. A cable that is improperly stored
4. A neatly coiled cable

4-41. You should examine and lubricate all lifting slings at least how often?

1. Once a week
2. Twice a week
3. Once a month
4. Twice a month

4-42. Hoisting restrictions for a specific type of aircraft can be found in which of the following publications?

1. NAVAIR 01-1A-8
2. NAVAIR 01-lA-17
3. NAVAIR 15-02-500B
4. Applicable MIM

4-43. What are the two types of aircraft jacks used by the Navy?

1. T-bar and camel
2. Hand-carried and T-bar
3. Horseshoe and outrigger
4. Axle and airframe (tripod)

4-44. Aircraft jacks are serviced with what type of fluid?

1. General-purpose oil
2. Heavy-duty machine oil
3. Aircraft hydraulic fluid
4. Support equipment hydraulic fluid

4-45. Special inspections are conducted on axle jacks at AIMD SE at what specified interval of time?

1. Every 4 weeks
2. Every 13 weeks
3. Every 26 weeks
4. Every 52 weeks

4-46. The designation A20-lHC is for what model of jack?

1. A 10-ton, hand-carried axle jack
2. A 20-ton, hand-carried axle jack
3. A 10-ton, cantilever axle jack
4. A 20-ton, horseshoe axle jack

4-47. What is another name for the T-bar axle jack?

1. Alligator jack
2. Crocodile jack
3. Toothpick jack
4. Hard tail jack

4-48. A wing, nose, or tail jack is also known by what name?

1. Tripod jack
2. Reptile jack
3. Portable axle jack
4. Fixed outrigger jack

4-49. A tripod jack consists of what total number of basic assemblies?

1. 1
2. 2
3. 3
4. 12

4-50. A leg extension kit for a variable height tripod jack will increase its effective height by what total amount of inches?

1. 6 inches
2. 12 inches
3. 18 inches
4. 24 inches

4-51. What manual lists alternate jacks for a given aircraft?

1. NAVAIR 01-70-19
2. NAVAIR 19-70-46
3. NAVAIR 19-75-40
4. NAVAIR 70-19-48

4-52. NAVAIR 19-600-135-6-1 is the general preoperational inspection MRC for what types of jacks?

1. Axle jacks only
2. Tripod jacks only
3. Airframe jacks only
4. All jacks

4-53. Which of the following statements is true regarding airframe jacks?

1. They have brakes
2. Their wheels can be locked in place
3. They may not be towed by using a towbar
4. Their wheels are spring loaded on the jack

4-54. To prevent an airframe jack from being lowered too rapidly, what component is installed as a safeguard?

1. A safety locknut
2. A hydraulic hand pump
3. A safety bypass valve
4. A hydraulic ram safety valve

4-55. When jacking aircraft aboard ship, you must have what minimum number of tie-down chains per jack?

1. Six
2. Two
3. Three
4. Seven

4-56. During jacking operations, the tie-down chain preload is too high when which of the following conditions exists?

1. The jack safety valve bypasses fluid
2. The first stage locknut does not turn
3. The tensioning grip cannot be rotated by hand
4. The jack baseplate is seated flush with the deck

4-57. As a bullet passes through the cell wall of a self-sealing fuel cell, the sealant springs together quickly and closes the hole. The aircraft may then continue its mission.

1. True
2. False

4-58. The self-sealing fuel cells now in naval service are made up of what total number of primary layers of material?

1. One
2. Two
3. Three
4. Four

4-59. What is the main advantage of a bladder-type fuel cell over a self-sealing fuel cell?

1. Fewer inspections
2. Less total weight
3. Thicker wall construction
4. Slightly smaller than the aircraft cavity

4-60. When applying the nylon barrier of a rubber-type bladder fuel cell, you should NOT use which of the following methods of application?

1. Swab
2. Brush
3. Spray
4. Roller

4-61. The milled skins of an integral fuel cell are normally fastened to the aircraft by what means?

1. Pins
2. Bolts
3. Rivets
4. Screws

4-62. A fuel leak that reappears 30 minutes after it is wiped dry is classified as what category of leakage?

1. Seep
2. Slow seep
3. Heavy seep
4. Running leak

4-63. What is the first step you should take to stop a fuel leak?

1. Reinject sealant around the perimeter of the cell
2. Replace the O-rings under all fasteners in the leak area
3. Retorque all fasteners 6 inches on either side of the leak area
4. Replace the Stat-O-Seal washers under all fasteners in the leak area

4-64. To allow the gun piston to return before another cycle can begin, the trigger of a sealant injector gun must be released approximately how often?

1. Every 30 seconds
2. Every 45 seconds
3. Every 15 minutes
4. Every 20 minutes

4-65. To pressure test the repair made on an integral fuel cell, you should use what gas?

1. Oxygen
2. Dry air
3. Nitrogen
4. Natural gas

ASSIGNMENT 5

Textbook Assignment: "Hydraulic Contamination and Related Servicing/Test Equipment." chapter 4, pages 4-1 through 4-40.

5-1. Which of the following problems is a major cause of hydraulic system and component failure?

1. Contamination
2. Loss of fluid
3. Fluid overheating
4. Air in the system

5-2. What is the maximum acceptable Navy Standard Class hydraulic fluid particulate level for (a) naval aircraft and (b) support equipment?

1. (a) 3 (b) 3
2. (a) 3 (b) 5
3. (a) 5 (b) 3
4. (a) 5 (b) 5

5-3. Hydraulic system fluid analysis is NOT required in which of the following situations?

1. When a hydraulic pump fails
2. When extensive maintenance has occurred
3. When the system is subjected to excessive heat
4. When the aircraft has flown 2 flights in less than 12 hours

5-4. When hydraulic system fluid is lost to the point that the hydraulic pump runs dry or cavitates, you should take what action?

1. Change the defective pump and flush the system
2. Change the defective pump and filter elements, and purge the system
3. Change the defective pump, check the filter elements, and decontaminate as required
4. Change the defective pump, change all filter elements, and decontaminate as required

5-5. Which of the following lubricants is NOT approved for O-ring seals?

1. VV-L-800
2. MIL-G-81322
3. MIL-H-46170
4. MIL-H-83282

5-6. Which of the following solvents is approved for cleaning hydraulic test stand connectors?

1. Naphtha
2. P-D-680
3. MIL-C-81302
4. MIL-T-81533A

5-7. Contamination can occur in which of the following forms?

1. Liquid only
2. Solid matter only
3. Gas or solid matter only
4. Liquid, solid matter, or gas

5-8. What type of contamination is most often found in naval aircraft hydraulic systems?

1. Gas
2. Air
3. Particulate
4. Organic oxidation

5-9. Organic contamination is produced by all EXCEPT which of the following processes?

1. Glass bead peening
2. Polymerization
3. Oxidation
4. Wear

5-10. Most of the metallic solid contamination is caused by which of the following hydraulic components?

1. Hoses
2. Pumps
3. Actuators
4. Reservoirs

5-11. The inorganic solid hydraulic system contaminant group includes all EXCEPT which of the following materials?

1. Dust
2. O-rings
3. Silicates
4. Paint particles

5-12. A spongy response during a hydraulic system operation would normally be caused by what type of contamination?

1. Air
2. Water
3. Inorganic
4. Particulate

5-13. Chlorinated solvents will hydrolyze to form hydrochloric acids when allowed to combine with minute amounts of which of the following substances?

1. Oil
2. Fuel
3. Water
4. Oxygen

5-14. A hydraulic oil cooler leak would cause which of the following types of contamination?

1. Air
2. Particulate
3. Foreign fluid
4. Nonmetallic solid

5-15. You can minimize the introduction of external or self-generated contaminants before collecting a hydraulic fluid sample by taking which of the following precautions?

1. Cleaning the internal parts of the fitting
2. Cleaning the external parts of the valve or fitting only
3. Dumping a small amount of the initial fluid flow only
4. Cleaning the external parts of the valve or fitting and dumping a small amount of the initial fluid flow

5-16. You should take a fluid sample from what point in a hydraulic system?

1. Downstream of any return line filters
2. Downstream of any suction line filters
3. From the system reservoir if it is the makeup type
4. Upstream of any return or suction line filters

5-17. The internal porting of a sampling point should not impede the passage of hard particulate matter up to what maximum diameter?

1. 250 microns
2. 500 microns
3. 750 microns
4. 900 microns

5-18. What is the primary hydraulic fluid contamination measurement method used at all levels of maintenance?

1. Visual
2. Patch testing
3. Halogen testing
4. Electronic particle count analysis

5-19. When you perform a hydraulic fluid patch test, the appearance of droplets or a stain on the test filter is an indication of what condition?

1. Free water
2. Fuel contamination
3. Improper sampling technique
4. Chlorinated solvent contamination

5-20. Before you sample SE hydraulic systems, the fluid must be recirculated at the full flow rate a minimum of how many minutes?

1. 5 min
2. 10 min
3. 15 min
4. 20 min

5-21. Aircraft filter assemblies are sampled by removing the filter bowl and transferring the fluid contents of both the bowl and the element to a clean sample bottle.

1. True
2. False

5-22. When processing a hydraulic fluid sample, you must use what type of filter?

1. Single 20-mm test filter
2. Single 47-mm test filter
3. Double 21-mm test filter
4. Double 47-mm test filter

5-23. You are processing a fluid sample and you have poured the hydraulic fluid from the graduate into the funnel. What total amount of solvent should you pour into the graduate?

1. 15 mL
2. 50 mL
3. 100 mL
4. 120 mL

5-24. If the hydraulic fluid test filter displays a rust color, what color contamination standard should you use for comparison?

1. Tan
2. Rust
3. Gray
4. Silica

5-25. An electronic particle count analysis of hydraulic fluid will NOT be affected by particles smaller than what size?

1. 50 microns
2. 25 microns
3. 15 microns
4. 5 microns

5-26. The halogen leak detector is powered by what source of energy?

1. Solar
2. Battery
3. 110 volts ac
4. 220 volts ac

5-27. When you circulate contaminated fluid through the filters in an aircraft and a portable hydraulic test stand, you are using which of the following decontamination methods?

1. Purging
2. Flushing
3. Purifying
4. Recirculation cleaning

5-28. Unless specified by other publications, a hydraulic system undergoing the recirculation cleaning process should be cycled a minimum of how many complete cycles?

1. 5 cycles
2. 10 cycles
3. 15 cycles
4. 25 cycles

5-29. You should perform a hydraulic fluid patch test from what system component to determine when system flushing is complete?

1. System reservoir fluid
2. System return line fluid
3. System pressure line fluid
4. Test stand reservoir fluid

5-30. Test stands used for hydraulic system flushing must have an internal reservoir that holds what minimum number of gallons?

1. 10 gal
2. 14 gal
3. 16 gal
4. 20 gal

5-31. Which of the following authorities is required to recommend and supervise an aircraft hydraulic system purging?

1. The commanding officer
2. The maintenance officer
3. The cognizant engineering activity
4. The cognizant functional wing commander

5-32. When a hydraulic system is purified, the fluid going to the purification tower is first filtered by what size filter?

1. 5 micron
2. 15 micron
3. 3 micron
4. 25 micron

5-33. When considering maintenance man-hours and material requirements, what method of hydraulic system decontamination is the most effective?

1. Purging
2. Flushing
3. Purifying
4. Recirculation cleaning

5-34. What fire-resistant type of hydraulic fluid was developed to replace MIL-H-5606?

1. MIL-H-6083
2. MIL-H-83282
3. MIL-H-46170
4. MIL-H-81019

5-35. Which of the following types of hydraulic fluids is used in extremely low temperatures?

1. MIL-H-5606
2. MIL-H-46170
3. MIL-H-81019
4. MIL-H-83282

5-36. When servicing hydraulic systems, you should use what type of filtration?

1. 3-micron (absolute)
2. 3-micron (nominal)
3. 5-micron (absolute)
4. 5-micron (nominal)

IN ANSWERING QUESTION 5-37, REFER TO TABLE 4-4 IN THE TEXTBOOK.

5-37. MIL-H-5606 is the only hydraulic fluid authorized for use with which of the following hydraulic fluid dispensing units?

1. HSU-1
2. D21929
3. H-250-1
4. AM27M- 10

5-38. The H-250-1 hydraulic servicing unit is equipped with what size service hose?

1. 5 ft
2. 6 ft
3. 7 ft
4. 8 ft

5-39. What is the maximum fluid holding capacity of the HSU-1 fluid servicing unit?

1. 1 gal
2. 2 gal
3. 3 gal
4. 4 gal

5-40. With every full stroke of the hand pump, the HSU-1 will deliver what quantity of fluid?

1. 1.5 fluid ounces
2. 2.0 fluid ounces
3. 3.5 fluid ounces
4. 4.0 fluid ounces

5-41. The Model 310 fluid servicing cart uses what type of pump?

1. Single-action hand pump
2. Double-action hand pump
3. Constant displacement, motor-driven pump
4. Variable displacement, motor-driven pump

5-42. What portable hydraulic test stand is replacing the AHT-64 test stand?

1. NAN-2
2. ANT-63
3. A/M27T-3
4. A/M27T-5

5-43. What is the maximum operating pressure of the A/M27T-3 portable hydraulic test stand?

1. 1,500 psi
2. 2,750 psi
3. 3,000 psi
4. 4,500 psi

5-44. The A/M27T-5 portable hydraulic test stand has what maximum flow rate at 3,000 psi?

1. 13 gpm
2. 24 gpm
3. 37 gpm
4. 71 gpm

5-45. The AHT-63 portable hydraulic test stand is powered by what means?

1. A hand pump
3. A diesel engine
3. An electric motor
4. A gasoline engine

5-46. Before operating a portable hydraulic test stand, you must ensure that the reservoir gauge indicates what minimum level?

1. 1/4 full
2. 1/2 full
3. 3/4 full
4. Full

5-47. What is the normal hydraulic fluid operating temperature of a portable hydraulic test stand?

1. 85°F
2. 110°F
3. 135°F
4. 212°F

5-48. What is the recommended minimum inside bent radius for a l-inch test stand hose?

1. 7.31 in.
2. 5.90 in.
3. 5.37 in.
4. 4.30 in.

5-49. When operating a portable hydraulic test stand on an aircraft system, you should use the test stand reservoir mode whenever practical for what reason?

1. This mode ensures positive flow to the aircraft pump
2. This mode eliminates the possibility of aircraft pump cavitation
3. This mode enables aircraft fluid deaeration during system operation
4. This mode allows the test stand reservoir supply valve to remain open, allowing greater back pressure in the return system

5-50. When you are using a portable hydraulic test stand during an aircraft operation, the bypass control should be in what position?

1. Half opened
2. Fully closed
3. Fully opened
4. Adjusted to operating pressure

5-51. During shutdown, before the throttle of an engine-driven portable hydraulic test stand is pushed completely closed, the engine should run at 1000 rpm for approximately how many minutes?

1. 1 min
2. 5 min
3. 10 min
4. 12 min

5-52. You can accomplish simultaneous multisystem operational checks on an aircraft by using which of the following methods?

1. By attaching a T-fitting between the aircraft system's main selector valve
2. By using separate hydraulic test stands for each aircraft system
3. By manifolding two or more aircraft systems to a common test stand
4. Both 2 and 3 above

5-53. The test chamber of the HCT-10 stationary hydraulic test stand is constructed from what material?

1. A l/4-inch steel plate
2. A l/2-inch steel plate
3. A l/2-inch aluminum plate
4. A 7/8-inch aluminum plate

5-54. When testing double-acting hydraulic cylinders on an HCT-10 test stand, which, if any, of the following test circuits should you use?

1. Pump
2. Static
3. Dynamic
4. None of the above

5-55. Air in a hydraulic system generates no problem as long as it remains in what state?

1. Free
2. Filtered
3. Dissolved
4. Entrained

5-56. When free air enters a fluid at a very high rate, the rapid collapse of bubbles generates extremely high local fluid velocities that are converted into impact pressures. What is this phenomenon known as?

1. Starvation
2. Cavitation
3. Modulation
4. Consumption

5-57. To facilitate the removal of free air, what components are sometimes provided at high points in the aircraft hydraulic circulatory system?

1. Check valves
2. Filler valves
3. Restrictor valves
4. Air bleed valves

5-58. While operating a hydraulic test stand, it appears that you have a loaded filter. At what point should you terminate operation of the test stand?

1. Immediately
2. Within 15 minutes of the indication
3. When you complete the operational check
4. After the fluid has cycled enough to allow the temperature to drop below 85°F

5-59. Age-controlled, deteriorative-type hoses used to carry hydraulic fluid in SE units should NOT remain in service for more than what maximum number of years beyond the manufacturer's cure date?

1. 5 yr
2. 6 yr
3. 7 yr
4. 8 yr

5-60. Prior to hydraulic fluid sampling, SE must be run for what minimum length of time?

1. 5 min
2. 7 min
3. 10 min
4. 15 min

5-61. After flushing the fittings on SE, you should open the *reservoir* drain valve and allow approximately what amount of fluid to drain into a waste receptacle?

1. 1 pint
2. 1 quart
3. 1/2 gallon
4. 1 gallon

5-62. When SE is found to be unacceptably contaminated with particulate matter, but the fluid is otherwise considered satisfactory, you should use which of the following decontamination methods?

1. Purging
2. Flushing
3. Purifying
4. Recirculation cleaning

5-63. When the hydraulic fluid of SE contains a substance not readily removed by the internal filters, what decontamination method should you use?

1. Purging
2. Flushing
3. Purifying
4. Recirculation cleaning

ASSIGNMENT 6

Textbook Assignment: "Hose Fabrication and Maintenance," chapter 5, pages 5-1 through 5-28.

6-1. Which of the following statements concerning the use of hose assemblies on aircraft is correct?

1. Hose assemblies deteriorate more rapidly than tubing
2. Hose assemblies are lighter than aluminum-alloy tubing
3. Hose assemblies should never be used with moving parts
4. Hose assemblies should be used instead of tubing as much as possible

6-2. Military aircraft and related equipment use what total number of basic types of hose?

1. One
2. Two
3. Three
4. Four

6-3. A rubber-covered, synthetic rubber hose is identified by markings that are stenciled along the length of the hose at what interval?

1. Every 6 in.
2. Every 7 in.
3. Every 9 in.
4. Every 4 in.

6-4. The cure date of synthetic rubber hose is indicated by what interval of time?

1. Year only
2. Month and year only
3. Day, month, and year
4. Quarter of year and year

6-5. Which of the following features is NOT an advantage of Teflon® hose?

1. Its long life
2. Its higher operating temperature range
3. Its chemical inertness to aircraft fluids
4. Its protective copper wire-braided covering

6-6. Identification bands on Teflon® hose are placed on the ends and at what other intervals?

1. 5 ft
2. 2 ft
3. 3 ft
4. 9 ft

6-7. Which of the following materials are used in the construction of hose fittings?

1. Aluminum, zinc, and carbon steel
2. Corrosion-resistant steel, brass, and magnesium
3. Carbon steel, aluminum, and corrosion-resistant steel
4. Graphite, bronze, aluminum, and corrosion-resistant steel

6-8. What two methods are used to secure hose fittings onto the hose?

1. Reusable and swage
2. Reusable and offset
3. Disposable and crimp
4. Disposable and permanent

6-9. What part of a hose fitting fits the inside diameter of the hose?

1. The nipple
2. The sleeve
3. The socket
4. The swivel

6-10. Which of the following is NOT a configuration for hose fitting nipples?

1. Flat
2. Flared
3. Flanged
4. Flareless

6-11. You should NEVER intermix hose fitting nipples and sockets from one manufacturer to another.

1. True
2. False

6-12. Flared and flareless hose fittings and nuts are color-coded for what purpose?

1. To identify the class or type
2. To identify materials or material finishes
3. To identify synthetic rubber or Teflon® application
4. To identify the commercial manufacturer or local fabrication

IN ANSWERING QUESTIONS 6-13 THROUGH 6-15, REFER TO TABLE 5-1 IN YOUR TEXTBOOK. SELECT FROM COLUMN B THE COLOR FOR THE FLARED FITTING MIL-F-5509 MATERIAL LISTED IN COLUMN A. NOT ALL ITEMS IN COLUMN B WILL BE USED.

	A. MATERIAL	B. COLOR
6-13.	Steel	1. Blue
6-14.	Aluminum 7075	2. Gray
6-15.	Titanium alloy	3. Black
		4. Brown

6-16. A commercially manufactured hose assembly date is indicated by the letter A, followed by what other information?

1. The quarter of the year and the last two digits of the year
2. The last two digits of the year and the quarter of the year
3. The last two digits of the year, the letter Q, and the quarter of the year
4. The quarter of the year, the letter Q, and the last two digits of the year

6-17. By what means is a commercially manufactured Teflon® hose assembly identified?

1. A tag
2. A band
3. A label
4. A stencil

6-18. After proof pressure testing a locally fabricated hose assembly, the identification tag must be installed what distance from the end fitting?

1. A maximum of 1/2 in.
2. A minimum of 1/2 in.
3. A maximum of 1/4 in.
4. A minimum of 1/4 in.

6-19. The fabrication of hose assemblies is a function of what maintenance level(s)?

1. Depot only
2. Intermediate only
3. Depot and intermediate only
4. Depot, intermediate, and organizational

6-20. When fabricating hose assemblies, you should refer to which of the following publications?

1. NAVAIR 01-1A-8
2. NAVAIR 01-1A-12
3. NAVAIR 01-1A-17
4. NAVAIR 01-1A-20

6-21. When fabricating a hose assembly, you should lubricate the inside bore of the hose and the outside surface of the nipple prior to insertion with which of the following materials?

1. Jet fuel
2. Engine oil
3. Hydraulic fluid
4. Isopropyl alcohol

IN ANSWERING QUESTION 6-22, REFER TO TABLE 5-2 IN THE TEXTBOOK.

6-22. When fabricating a -10 hose using two MS24587 fittings, you must allow what total amount of extra hose length for the cutoff factor?

1. 1.25 in.
2. 2.00 in.
3. 2.75 in.
4. 3.00 in.

6-23. When hose assemblies are located in areas where temperatures exceed the capabilities of the hose material, you should install which of the following items?

1. High-temp hoses
2. Fiberglass blankets
3. Stainless steel conduits
4. Protective firesleeves

6-24. What is the preferred cleaning material for hose assemblies?

1. P-D-680, type I
2. P-D-680, type II
3 MIL-C-43616, type I
4. MIL-C-81309, type II

6-25. If a hose assembly is NOT going to be proof pressure tested immediately after it is cleaned, which of the following procedures should you perform next?

1. Purge it with inert gas
2. Fill it with hydraulic fluid
3. Flush it with preservative oil
4. Install protective closures on it

IN ANSWERING QUESTION 6-26, REFER TO TABLE 5-5 IN THE TEXTBOOK.

6-26. When used for a hydraulic system, what is the maximum proof pressure for a No. 4, MIL-H-8795, medium pressure, rubber hose?

1. 6,000 psi
2. 7,000 psi
3. 8,000 psi
4. 9,000 psi

6-27. What is (a) the minimum proof pressure time and (b) the maximum proof pressure time that should be applied to a hose assembly?

1. (a) 5 sec
   (b) 5 min
2. (a) 5 sec
   (b) 10 min
3. (a) 30 sec
   (b) 5 min
4. (a) 30 sec
   (b) 30 min

6-28. A Greer hydraulic hose burst test stand is capable of developing what maximum static pressure?

1. 30,000 psi
2. 33,000 psi
3. 35,000 psi
4. 37,000 psi

6-29. Before operating a Greer hydraulic hose burst test stand, you are required to perform all EXCEPT which of the following checks?

1. Ensure that the reservoir is full
2. Ensure that the shop air line is connected
3. Ensure that the fuel tank is at least 3/4 full
4. Ensure that the pressure regulator is turned to the low-pressure position

6-30. A Greer hose burst test stand has a red follower pointer on the fluid pressure gauge for what purpose?

1. To indicate preset proof pressure
2. To indicate the pressure in the test hose
3. To indicate the minimum test hose burst pressure
4. To indicate the maximum pressure applied to the test hose

6-31. The CGS Scientific Corporation hose burst test stand provides a means of testinq hoses up to what maximum (a) hydraulic pressure and (b) pneumatic pressure?

1. (a) 7,000 psi
   (b) 3,500 psi
2. (a) 10,000 psi
   (b) 3,000 psi
3. (a) 15,000 psi
   (b) 1,500 psi
4. (a) 30,000 psi
   (b) 5,000 psi

6-32. You are using a CGS Scientific Corporation hose test stand and the hose you want to test is too short to be connected between the manifolds. What action should You take to test the hose?

1. Adjust the rear manifold
2. Adjust the front manifold
3. Install an extension hose
4. Install a cap at one end of the hose

6-33. When testing a hose assembly on the CGS Scientific Corporation hose test stand, what action must you take if the pressure will exceed 2,000 psi?

1. Open the manifold bleed valve
2. Turn off the gauge shutoff valve
3. Adjust the oil pressure regulator
4. Turn the selector valve to the oil boost pump position

6-34. When using a CGS Scientific Corporation hose test stand, you must keep the test hose at test pressure for what minimum time before filling the test chamber with water?

1. 1 min
2. 2 min
3. 3 min
4. 4 min

6-35. Maintenance of hose assemblies at the organizational level is limited to which of the following actions?

1. Replacement only
2. Preventive maintenance and replacement only
3. Contamination control, preventive maintenance, and removal only
4. Contamination control, preventive maintenance, removal, installation, and replacement

6-36. What is the first step you should take if a leak appears in the swivel nut area of a hose assembly?

1. Clean the swivel nut
2. Check for contamination
3. Replace the hose assembly
4. Check that the swivel nut is properly torqued

6-37. Which of the following problems associated with a hose assembly would NOT be a reason for replacement?

1. A torn firesleeve
2. A cracked chafe guard
3. The lockwire is broken
4. The protective weather coating is worn, exposing the hose

6-38. You should NOT use clamps with fuel-resistant cushioning unnecessarily for which of the following reasons?

1. The clamps have poor vibration dampening
2. The clamps cost more than standard clamps
3. The cushioning material on the clamps deteriorates rapidly when exposed to air
4. The cushioning material on the clamps lodges between the end tabs of a closed clamp

6-39. What is the first action you should take prior to removing a hose assembly?

1. Remove the lockwire
2. Remove the supporting clamps
3. Protect the preformed areas of the hose
4. Perform contamination control procedures

6-40. Which of the following fluids should you use when installing hydraulic hoses?

1 MIL-H-5606 only
2. MIL-H-81019 only
3. MIL-H-83282 or MIL-H-5606 only
4. MIL-H-5606, MIL-H-83282, or MIL-H-81019

IN ANSWERING QUESTION 6-41, REFER TO TABLE 5-8 IN THE TEXTBOOK.

6-41. What is the minimum allowable bend radius for a -5 high-pressure, MIL-H-8788, rubber hose?

1. 1.00 in.
2. 2.25 in.
3. 3.38 in.
4. 5.00 in.

6-42. When checking a hose assembly braid, what is the maximum acceptable number of broken wires you can have per linear foot?

1. 6 wires
2. 7 wires
3. 8 wires
4. 9 wires

6-43. Hose assemblies should be installed with a slight bow to compensate for contraction pressure on the line.

1. True
2. False

IN ANSWERING QUESTION 6-44, REFER TO TABLE 5-9 IN THE TEXTBOOK.

6-44. What is the maximum torque for a No. 10 aluminum swivel nut?

1. 260 in.-lb
2. 360 in.-lb
3. 500 in.-lb
4. 700 in.-lb

6-45. Torque values for hose assemblies on specific aircraft can be found in what publications?

1. IPBs
2. MIMs
3. MRCs
4. NATOPS

6-46. You are applying the final torque to a hose assembly. To prevent rotation and scoring of the fitting's sealing surface, you should manually hold what component?

1. The hose
2. The fitting
3. The jam nut
4. The swivel nut

6-47. To avoid abrasion and kinking where flexing occurs, you should support and secure hose assemblies with what items?

1. Clamps
2. Spot ties
3. Shear wires
4. Bundle ties

6-48. What is the maximum shelf life of bulk synthetic rubber hose from the cure date?

1. 8 quarters
2. 16 quarters
3. 32 quarters
4. 64 quarters

6-49. What is the maximum shelf life, if any, of Teflon® (PTFE) hose?

1. 12 quarters
2. 24 quarters
3. 48 quarters
4. None

6-50. A medium-pressure synthetic rubber hose that is exposed to heat and fuel has what maximum service life?

1. 28 quarters
2. 32 quarters
3. 48 quarters
4. 72 quarters

6-51. Hose and hose assemblies should be stored in an area that has which of the following environmental factors?

1. Damp and dark
2. Warm and moist
3. Dark, cool, and dry
4. Moist, bright, and cool

ASSIGNMENT 7

Textbook Assignment: "Tubing Fabrication and Maintenance," chapter 6, pages 6-1 through 6-30.

7-1. What number tubing has an outside diameter of 3/8 inch?

1. No. 6
2. No. 8
3. No. 10
4. No. 12

IN ANSWERING QUESTION 7-2, REFER TO TABLE 6-1 IN THE TEXTBOOK.

7-2. Which of the following types of corrosion-resistant steel tubing should be used when temperatures will exceed 1250°F?

1. MIL-T-6845
2. MIL-T-8504
3. MIL-T-8606
4. MIL-T-8973

7-3. What aluminum alloy tubing is authorized for the repair or replacement of any aluminum line?

1. 5052
2. 5052-0
3. 6061-T4
4. 6061-T6

IN ANSWERING QUESTIONS 7-4 THROUGH 7-6, REFER TO TABLE 6-3 IN YOUR TEXTBOOK. SELECT FROM COLUMN B THE COLOR FOR THE AN/MS TUBE FITTING MATERIAL LISTED IN COLUMN A. NOT ALL ITEMS IN COLUMN B WILL BE USED.

A. MATERIAL	B. COLOR
7-4. Corrosion-resistant steel	1. Cadmium-plate
7-5. Aluminum-bronze	2. Blue
7-6. Aluminum alloy	3. Black
	4. Natural

7-7. When fabricating tube assemblies, you should refer to what manual?

1. NAVAIR 01-1A-8
2. NAVAIR 01-1A-17
3. NAVAIR 01-1A-20
4. NAVAIR 01-1A-509

7-8. A standard tube cutter should be rotated in what direction?

1. Clockwise
2. Counterclockwise
3. Toward its open side
4. Toward its closed side

7-9. If neither a standard or Permaswage tube cutter is available, you should use what tool to cut a tube?

1. Nippers
2. Hacksaw
3. Hand shears
4. Bolt cutter

7-10. In what direction is the Permaswage deburring tool rotated?

1. Clockwise
2. Counterclockwise
3. Toward its open side
4. Toward its closed side

7-11. When a tube is deburred, with a Permaswage deburring tool, the chamfer should NOT exceed what total amount of the tube's wall thickness?

1. 1/4
2. 1/3
3. 1/2
4. 2/3

7-12. On a hand tube bender, O to 180 degrees of bend is marked on what component?

1. The clip
2. The handle
3. The slide bar
4. The radius block

7-13. The mechanical tube bender is equipped to bend tubes from what minimum to maximum diameter?

1. 1/4 to 3/4 in.
2. 1/16 to 3/4 in.
3. 5/16 to 13/16 in.
4. 3/16 to 15/16 in.

7-14. Fusible alloy QQ-F-838 should be used to pack tubes made of which of the following materials?

1. Titanium
2. Carbon steel
3. Aluminum alloy
4. Stainless steel

7-15. There are a total of how many types of flared tubing joints?

1. One
2. Two
3. Three
4. Four

7-16. A brake line made of corrosion-resistant steel should have which of the following types of flares?

1. Single flare only
2. Double flare only
3. Single or double flare
4. Triple flare

7-17. You are preparing to double flare a tube by placing the tube into the die block. What prescribed length of tube should protrude beyond the countersunk end?

1. l/8 in.
2. 1/4 in.
3. 1/3 in.
4. 1/2 in.

7-18. In case of an emergency, an aluminum flareless-tube connector may be used as a presetting tool what total number of times?

1. One
2. Two
3. Three
4. Four

7-19. When a flareless fitting is preset, the sleeve is positioned on the tube in what manner?

1. The pilot and cutting edge of the sleeve point toward the end of the tube
2. The pilot and cutting edge of the sleeve point away from the end of the tube
3. The pilot points toward the end of the tube, and the cutting edge of the sleeve points away from the end of the tube
4. The pilot points away from the end of the tube, and the cutting edge of the sleeve points toward the end of the tube

IN ANSWERING QUESTIONS 7-20 THROUGH 7-23, REFER TO TABLE 6-4 IN THE TEXTBOOK. SELECT FROM COLUMN B THE THREAD LUBRICANT FOR THE SYSTEM LISTED IN COLUMN A.

	A. SYSTEM	B. LUBRICANT
7-20.	Freon	1. MIL-H-5606
7-21.	Hydraulic	2. MIL-G-4343
7-22.	Oil	3. MIL-O-6032
7-23.	Pneumatic	4. MIL-L-6085A

7-24. The sleeve of a flareless fitting is allowed to move lengthwise what maximum amount?

1. 1/16 in.
2. 3/64 in.
3. 1/32 in.
4. 1/64 in.

IN ANSWERING QUESTION 7-25, REFER TO TABLE 6-5 IN THE TEXTBOOK.

7-25. The tube projection from the sleeve pilot to the tube end of a No. 12 tube should be approximately what length?

1. 7/64 in.
2. 5/32 in.
3. 11/64 in.
4. 7/32 in.

IN ANSWERING QUESTION 7-26, REFER TO TABLE 6-6 IN THE TEXTBOOK.

7-26. One-fourth inch 6061 aluminum tubing should have what minimum inside tube diameter?

1. 0.060 in.
2. 0.095 in.
3. 0.150 in.
4. 0.180 in.

7-27. According to NAVAIR 01-1A-20, a tube assembly that has an operating pressure of 3,000 psi should be proof pressure tested to what maximum pressure?

1. 3,000 psi
2. 6,000 psi
3. 9,000 psi
4. 12,000 psi

7-28. Tube assemblies must be cleaned after fabrication. What is the preferred cleaning material for hydraulic lines?

1. Isopropyl alcohol
2. P-D-680, Type II
3. MIL-T-81533
4. MIL-C-81302

7-29. Special precautions required for testing and cleaning oxygen tube assemblies can be found in MIL-STD-1359.

1. True
2. False

7-30. The interior tube assemblies of an aircraft require what type of protective finish?

1. One coat of epoxy polyamide primer
2. Two coats of zinc chromate primer
3. One coat of aliphatic polyurethane paint
4. Two coats of nitrocellulose acrylic lacquer paint

7-31. With some exceptions, identification tapes are NOT applied to lines less than what maximum diameter?

1. 1 in.
2. 2 in.
3. 3 in.
4. 4 in.

7-32. The function of a line is identified by a l-inch-wide tape that contains words, colors, and symbols. When color codes are used to identify the line function, at what location are they found on the tape?

1. One-half the total width on the left side of the tape
2. One-half the total width on the right side of the tape
3. Three-fourths the total width on the left side of the tape
4. Three-fourths the total width on the right side of the tape

7-33. What total number of general classes of hazards are found in connection fluid lines?

1. Seven
2. Six
3. Five
4. Four

IN ANSWERING QUESTION 7-34, REFER TO TABLE 6-9 IN THE TEXTBOOK.

7-34. Which of the following hazards is associated with the use of oils and greases?

1. FLAM
2. AAHM
3. PHDAN
4. TOXIC

7-35. What type of lines alternately carry pressure and return fluid from an actuating unit?

1. Return lines
2. Supply lines
3. Pressure lines
4. Operating lines

7-36. At the organizational level, you are NOT allowed to perform which of the following maintenance actions on tube assemblies?

1. Repair
2. Inspection
3. Fabrication
4. Replacement

7-37. A tube assembly has a dent with a depth of less than 20 percent of the tubing diameter. The dent is unacceptable if it is in which of the following locations?

1. A straight section of tubing
2. The heel of a short bend radius
3. A section of tubing with a diameter of less than one-half inch
4. A section of aluminum tubing carrying pressures greater than 500 psi

7-38. An aluminum alloy tube assembly that carries a pressure of 1,500 psi has a scratch greater than 15 percent of the wall thickness. Which of the following maintenance actions should you take?

1. Replace the tube assembly
2. Replace the scratch by welding
3. Rework the scratch by machine-burring
4. Rework the scratch by burnishing with hand tools

7-39. When installing a tube assembly, you should cover disconnected nonsealed joints with what type of sealing material?

1. MIL-S-8802
2. MIL-S-83430
3. MIL-s-81733
4. MIL-S-38249

7-40. If a steel-flared tube assembly leaks after it has been tightened to the proper torque, what additional amount of tightening, if any, is allowed beyond the noted torque?

1. 1/2 turn
2. 1/8 turn
3. 1/16 turn
4. None

7-41. When installing flareless tube assemblies, you should tighten the nut, if accessible, by which of the following means until resistance to turning is felt?

1. Hand
2. Open-end wrench
3. Split-box wrench
4. Slip-joint pliers

7-42. All hydraulic tubing should be supported from rigid structures by which of the following methods?

1. Sleeves
2. Support clamps
3. Nylon strap ties
4. Flexible grommets

IN ANSWERING QUESTION 7-43, REFER TO TABLE 6-10 IN THE TEXTBOOK.

7-43. What is the maximum allowable distance between supports for a 3/8 inch outside diameter aluminum alloy tube assembly?

1. 12 in.
2. 16 1/2 in.
3. 20 in.
4. 27 1/2 in.

7-44. What are the two categories of tube repair?

1. Splice and replace
2. Splice and emergency
3. Temporary and rework
4. Temporary and permanent

7-45. An annular tool should be used to correct which of the following types of minor damage?

1. Crossed threads
2. Orifice restriction
3. Damaged wrench pads
4. Damaged or ridged seats

7-46. Permaswage fittings are designed for use at what level(s) of maintenance?

1. Depot only
2. Intermediate only
3. Organizational and intermediate only
4. Organizational, intermediate, and depot

7-47. You are repairing a tube assembly using Permaswage fittings and techniques. This is considered what type of repair?

1. Splice
2. Temporary
3. Permanent
4. Emergency

7-48. The Permaswage tube repair equipment consists of what two series?

1. D1000 and D1230
2. D1100 and D2000
3. D10000 and D12200
4. D10000 and D20000

7-49. What total number of components are in a Dynatube fitting?

1. Five
2. Two
3. Three
4. Four

7-50. What tools should be used to support and position Dynatube fittings during swaging?

1. Finger dies
2. Finger collars
3. Holding fixture dies
4. Holding fixture collars

ASSIGNMENT 8

Textbook Assignment: "Basic Hydraulic/Pneumatic and Emergency Power Systems," chapter 7, pages 7-1 through 7-46.

8-1. A system that combines the use of hydraulics and pneumatics is known by what term?

1. Hydroponics
2. Pneumatolytic
3. Pneumatophore
4. Hydropneumatlcs

8-2. Hydraulic flight control system design specifications require what total number of separate systems for operation of the primary flight controls?

1. One
2. Two
3. Three
4. Four

8-3. In an open-center hydraulic system, what type of valve prevents pressure from building up until a demand is placed on the system?

1. A check valve
2. A bypass valve
3. A selector valve
4. A pressure relief valve

8-4. In an open-center hydraulic system, the selector valve automatically returns to the neutral position and to open-center flow when the actuating mechanism reaches the end of its cycle and the system relief valve setting is reached. This is known as what type of selector valve?

1. Manually engaged and pressure disengaged
2. Manually engaged and manually disengaged
3. Pressure engaged and pressure disengaged
4. Pressure engaged and manually disengaged

8-5. A closed-center hydraulic system with a variable displacement pump has what type of valve installed as a backup safety for over pressurization?

1. A check valve
2. A bypass valve
3. A relief valve
4. A selector valve

8-6. What type of hydraulic control valves and actuators operate the primary flight controls?

1. Single acting
2. Double acting
3. Hydropneumatic
4. Tandem construction

IN ANSWERING QUESTIONS 8-7 AND 8-8, REFER TO FIGURE 7-2 IN THE TEXTBOOK.

8-7. The reservoir is pressurized by what force?

1. Ram air
2. Engine bleed air
3. Hydraulic pressure
4. Accumulator preload

8-8. What valve shuts off flow to the secondary systems during flight?

1. The air valve
2. The check valve
3. The snubber valve
4. The isolation valve

8-9. According to military specifications, all hydraulically operated systems considered essential to flight safety or landing must have provisions for emergency actuation.

1. True
2. False

8-10. What component stores the supply of fluid for a hydraulic system?

1. An actuator
2. A reservoir
3. A selector valve
4. A hydraulic motor

8-11. A finger strainer is installed in the filler neck of some nonpressurized reservoirs for what purpose?

1. To trap air that enters the system
2. To clean the fluid as the reservoir is filled
3. To clean the fluid as it leaves the reservoir
4. To serve as a reservoir pressure bypass

8-12. The instruction plate of a reservoir contains all EXCEPT which of the following information?

1. The specification number and color of the fluid to be used
2. The complete instructions for filling the reservoir
3. The frequency the reservoir should be purged
4. The fluid capacity of the reservoir

8-13. There are a total of how many classes of hydraulic reservoirs?

1. One
2. Two
3. Three
4. Four

8-14. The fluid quantity of a nonpressurized reservoir is indicated by a float and arm liquidometer. The liquidometer is operated by what means?

1. Mechanically
2. Electrically
3. Pneumatically
4. Hydraulically

8-15. What is the purpose of a reservoir pressure and vacuum-relief valve?

1. To vent the reservoir to the cabin
2. To maintain 15 psi in the reservoir
3. To allow fluid to flow between the main system reservoirs
4. To maintain a differential pressure range between the reservoir and the cabin

8-16. In an air-pressurized reservoir, the fluid quantity is indicated by what means?

1. The distance the piston rod protrudes from the reservoir end cap
2. The level of fluid shown in the sight gauge
3. The level of fluid in the filter neck
4. The level of fluid on the dip stick

8-17. What is the purpose of a chemical air dryer?

1. To prevent air from entering the system
2. To seal the reservoir at the filler neck
3. To prevent moisture from escaping from the reservoir
4. To absorb moisture that may collect from air entering the system

8-18. Normally, an air pressure regulator maintains what amount of pressure in the reservoir?

1. 10 psi
2. 15 psi
3. 40 psi
4. 90 psi

8-19. An air-relief valve is usually incorporated in the air portion of a hydraulic power system to relieve excessive air pressure that may enter the system from what malfunctioning component?

1. A check valve
2. A filler valve
3. A chemical air dryer
4. An air pressure regulator

8-20. To allow pressurized air from the reservoir to flow through the air bleeder valve to an overboard vent, you should take what action?

1. Depress the push button
2. Release the push button
3. Turn the hex nut clockwise
4. Turn the hex nut counterclockwise

8-21. A fluid-pressurized reservoir is divided into two chambers by what device?

1. A pressure probe
2. A vertical baffle
3. A floating piston
4. A horizontal diaphragm

8-22. For the operation of actuating units in an emergency, what type of pump is generally installed?

1. A motor-driven pump
2. A double-action pump
3. An engine-driven pump
4. A single-action hand pump

8-23. What type of hand pumps is used in naval aircraft hydraulic systems?

1. Single-action
2. Simple-stroke
3. Double-action
4. Compound-stroke

IN ANSWERING QUESTION 8-24, REFER TO FIGURE 7-13 IN THE TEXTBOOK.

8-24. What action takes place when the piston in the pump is moved to the right?

1. Check valve A opens; check valve B closes; fluid enters port C
2. Check valve A closes; check valve B opens; fluid exits port D
3. Check valve A opens; check valve B closes; fluid exits port D
4. Check valve A closes; check valve B closes; fluid exits port D

8-25. When air is in the emergency hydraulic system and the handle of the hand pump is moved to the right, what handle reaction, if any, will occur?

1. It will creep slowly to the left only
2. It will creep slowly to the left and then spring rapidly to the right
3. It will spring rapidly to the left
4. None

8-26. A pump that delivers 3 gallons of fluid per minute at a speed of 2,800 rpm, and continues to deliver at that rate regardless of the pressure in the system, is known as what type of pump?

1. A variable displacement pump
2. A constant displacement pump
3. A rotary action pump
4. A gear-type pump

8-27. The use of a variable displacement pump in a hydraulic system eliminates the need for what component?

1. A reservoir
2. An accumulator
3. A hydraulic fuse
4. A pressure regulator

8-28. Gear-type pumps are usually driven by what means?

1. A dc electric motor
2. An ac electric motor
3. An aircraft engine
4. A servo unit

8-29. A piston-type (constant displacement) pump sucks fluid into one port and forces it out the other port. This is known as what type of piston motion?

1. Axial
2. Rotary
3. Reciprocating
4. Counterrotating

8-30. To change the rotation of a piston-type (constant displacement) pump, you must perform which of the following functions?

1. Reverse the drive gears
2. Reverse the universal link
3. Rotate the valve plate 90 degrees
4. Rotate the valve plate 180 degrees

8-31. The internal parts of a Stratopower (variable displacement) pump perform what four major functions?

1. Hydraulic drive, flow control, pressure regulation, and bypass
2. Pressure control, mechanical drive, bypass, and fluid displacement
3. Bypass, pressure regulation, fluid displacement, and hydraulic drive
4. Pressure control, flow control, mechanical drive, and pressure regulation

8-32. A Stratopower pump has creep plates installed for what purpose?

1. To increase the angle of the drive cam
2. To decrease wear on the revolving cam
3. To provide a support for the stationary bearing
4. To ensure proper alignment of the nutation plate

8-33. During operation of a Stratopower pump in a nonflow condition, lubrication is provided by what means?

1. A bypass system
2. A bypass piston
3. A compensator piston
4. A compensator spring

8-34. To provide a positive fluid pressure at the suction port, what type of boost pump is incorporated into the Vickers electric, motor-driven, variable displacement pump?

1. A centrifugal boost pump
2. A Stratopower boost pump
3. A ramp-type boost pump
4. A turbo boost pump

8-35. As system pressure drops, the Vickers electric, motor-driven pump will provide what maximum flow rate?

1. 6 gpm at 2,900 psi
2. 8 gpm at 2,200 psi
3. 8 gpm at 3,000 psi
4. 9 gpm at 3,100 psi

8-36. During an inspection you find metal slivers on the gearbox magnetic drain plug of a Vickers electric, motor-driven pump. What action should you take?

1. Replace the gearbox
2. Replace the magnetic plug
3. Drain and service the pump
4. Remove the pump for overhaul

8-37. Relief valves are installed in aircraft hydraulic systems for what purpose?

1. To aid in control stick movement
2. To prevent shock strut overpressurization
3. To protect the system from excessive fluid pressurization
4. To direct the flow of fluid from the pump to the actuators

8-38. To increase the opening pressure of a thermal relief valve, what action must you take?

1. Turn the adjusting screw clockwise
2. Turn the adjusting screw counterclockwise
3. Replace the poppet spring and ball with a larger one
4. Replace the poppet spring and ball with a smaller one

8-39. A shutoff valve is used for all EXCEPT which of the following purposes?

1. To control the flow of fluid
2. To relieve excessive pressure
3. To control the speed a component moves
4. To help isolate trouble by shutting off systems or subsystems

8-40. An electric solenoid shutoff valve is also referred to as what type of valve?

1. A priority valve
2. A sequential valve
3. A compensator valve
4. An electrocontrol valve

8-41. You can stop the flow of fluid in a needle-type, manual shutoff valve by which of the following means?

1. Pulling the lever
2. Pushing the lever
3. Turning the handle in a clockwise direction
4. Turning the handle in a counterclockwise direction

8-42. What is the maximum allowable temperature for any type of military aircraft hydraulic system?

1. 100°F
2. 200°F
3. 300°F
4. 400°F

8-43. A radiator-type hydraulic fluid cooler uses what medium for cooling?

1. Engine oil
2. Engine fuel
3. Ambient air
4. Electric blower

8-44. What component is used to conserve space and provide a means where common fluid lines may come together?

1. A venturi
2. A network
3. A manifold
4. A control center

8-45. What three basic units make up a filter assembly?

1. Filter element, bowl, and poppet
2. Bowl, head assembly, and filter element
3. Head assembly, bypass valve, and filter element
4. Differential pressure indicator, bowl, and filter element

8-46. What type of noncleanable filter element is used on most naval aircraft?

1. 5-micron (absolute)
2. 3-micron (absolute)
3. 3-micron
4. 5-micron

8-47. The differential pressure indicator on a filter assembly is reset by what means once the button is extended?

1. Pneumatically
2. Hydraulically
3. Electrically
4. Manually

8-48. To prevent fluid loss when the bowl has been removed, most filter assemblies incorporate what item in the head?

1. A check valve
2. A cover plate
3. A quick disconnect
4. An automatic shutoff valve

8-49. Prior to the installation of a cleaned filter bowl, the bowl should be filled with new filtered hydraulic fluid from an authorized servicing unit.

1. True
2. False

8-50. What type of accumulator is most commonly used in high-pressure hydraulic systems?

1. The ball type
2. The diaphragm type
3. The spherical type
4. The cylindrical type

8-51. Which of the following components is/are NOT a part of a cylindrical type accumulator?

1. Rubber diaphragm
2. Piston assembly
3. Cylinder
4. End caps

8-52. You can preload an accumulator by using which of the following procedures?

1. Pressurizing the fluid chamber with compressed air
2. Filling the fluid chamber with a prescribed amount of fluid
3. Inflating the air chamber to a predetermined pressure below the system operating pressure
4. Inflating the air chamber to a predetermined pressure above the system operating pressure

8-53. Most naval aircraft are equipped with air pressure gauges to read the preload of an accumulator after relieving hydraulic system pressure.

1. True
2. False

8-54. To indicate the amount of pressure in a hydraulic system, naval aircraft use what two types of pressure gauges?

1. Synchro and electric
2. Direct-reading and synchro
3. Direct-reading and Bourdon
4. Direct-reading and indirect-reading

8-55. The Bourdon tube in a direct-reading pressure gauge is operated by what means?

1. Spring action
2. Fluid pressure
3. Electrical current
4. Mechanical linkage

8-56. A synchro-type pressure indicator transmits what type of signal from the synchro to the indicator?

1. Pneumatic
2. Hydraulic
3. Mechanical
4. Electrical

8-57. To prevent damage to gauges and pressure transmitters, hydraulic systems use what component?

1. Pressure regulators
2. Restrictor valves
3. Snubbers
4. Buffers

8-58. An aircraft emergency power system pump can be powered by which of the following methods?

1. A hand pump
2. A ram-air turbine
3. An electric motor
4. Each of the above

8-59. The pressure switch of an electric, motor-driven, emergency power system is actuated by what means?

1. Manually, by the pilot
2. Mechanically, by the pump motor
3. Automatically, by hydraulic pressure
4. Electrically, by the emergency switch

8-60. The ram-air turbine assembly of an emergency power system is extended into the slipstream (a) by what means and (b) during what condition?

1. (a) Automatically
   (b) when a hydraulic failure occurs
2. (a) Automatically
   (b) when an engine failure occurs
3. (a) Manually
   (b) when released from the cockpit
4. (a) Electronically
   (b) when released-from the cockpit

8-61. Extension of the ram-air turbine assembly is initiated by what force acting on the turbine actuator?

1. Gravity
2. Airstream
3. Spring loaded
4. Hydraulic pressure

8-62. The air compressor in an aircraft pneumatic system is supplied air from what source?

1. An electric-driven fan
2. The aircraft engine
3. A ram-air turbine
4. The ambient air

8-63. The air compressor in an aircraft pneumatic system is operated by what means?

1. A mechanical motor
2. An electric motor only
3. A hydraulic motor only
4. An electric or hydraulic motor

8-64. In an aircraft pneumatic system, the moisture separator is always in which of the following locations?

1. Downstream of the compressor
2. Downstream of the reservoir
3. Upstream of the compressor
4. Upstream of the reservoir

8-65. A chemical air drier cartridge is NOT contaminated when it is what color?

1. Red
2. Blue
3. Pink
4. White

8-66. Pneumatic storage cylinders are used in aircraft pneumatic systems for which of the following purposes?

1. To store air only
2. To serve as a moisture trap only
3. To store air and serve as a moisture trap
4. To serve as a pneumatic shutoff valve while in flight

8-67. If the instruction plate is missing from an air storage cylinder, you can find servicing information in which of the following publications?

1. IPB
2. MIM
3. MRC
4. NATOPS

ASSIGNMENT 9

Textbook Assignment: "Basic Actuating Systems," chapter 8, pages 8-1 through 8-23.

9-1. What unit transforms hydraulic fluid pressure into mechanical force, which performs work by moving some mechanism?

1. An actuating unit
2. A cylinder unit
3. A control unit
4. A power unit

9-2. Naval aircraft use which of the following types of actuating units?

1. Linkage units
2. Hydraulic motors only
3. Actuating cylinders only
4. Hydraulic motors and actuating cylinders

9-3. Aircraft actuating cylinders are used when which of the following mechanism movements are required?

1. Bilateral motion
2. Linear motion only
3. Reciprocating motion only
4. Linear or reciprocating motion

9-4. What is the most common type of actuating cylinder used on naval aircraft?

1. Balanced
2. Cushioned
3. Unbalanced
4. Dual hydropneumatic

9-5. If hydraulic pressure is used to move a single-acting actuating cylinder in only one direction, all EXCEPT which of the following forces may be used to move it in the opposite direction?

1. Gravity
2. Fluid bypass
3. Spring tension
4. Nitrogen pressure

9-6. The operation of a single-acting, spring-loaded, piston-type actuating cylinder is normally controlled by what component?

1. A directional control valve
2. A limiting switch
3. A priority valve
4. A sequence valve

9-7. In reference to a double-acting, piston-type actuating cylinder, which of the following statements is correct?

1. There are two pressure and two return ports
2. The cylinder contains two pistons and one rod
3. Fluid pressure can be applied to either side of the piston
4. The stroke of the piston rod travels in one direction only

9-8. An unbalanced, double-acting, piston-type actuating cylinder uses a directional control valve capable of directing fluid in what total number of ways?

1. One
2. Two
3. Three
4. Four

9-9. To prevent internal leakage from one-side of the piston to the other, double-acting, piston-type actuating cylinders are equipped with which of the following items?

1. Backup rings only
2. Backup rings and O-rings only
3. Backup rings, O-rings, and metal scrapers only
4. Backup rings, O-rings, metal scrapers, and felt wipers

IN ANSWERING QUESTION 9-10, REFER TO FIGURE 8-3 IN THE TEXTBOOK.

9-10. When the cylinder is in the down and locked position, the locking ball bearings are held in the locking position by what means?

1. Hydraulic pressure
2. A ball-lock plunger
3. Detent springs
4. A piston shaft

9-11. To equalize the displacement of fluid on either side of the piston, a double-action, finger-lock actuator incorporates what component?

1. A piston spring
2. A balance shaft
3. An inner cylinder
4. An integral spring-loaded mechanical lock

9-12. The finger-lock actuators used on the landing gear have a down-limit switch mounted on and through the cylinder area for what purpose?

1. To indicate when the landing gear is down and locked
2. To allow pressure to be released during jacking operations
3. To allow the pilot to release the down locks during emergencies
4. To control hydraulic pressure to the emergency pneumatic extension line

9-13. During normal extension of a landing gear finger-lock actuator, which of the following forces move(s) the piston over the fingers?

1. The airstream only
2. Hydraulic pressure only
3. Hydraulic pressure and spring tension only
4. Hydraulic pressure, spring tension, and the airstream

9-14. In a power-operated flight control system, all the force necessary for deflecting the control surface is supplied by hydraulic pressure and wind force.

1. True
2. False

9-15. A tandem-type, control surface actuating cylinder uses a synchronizing rod for what purpose?

1. To direct pressure to each control surface
2. To isolate fluid pressure during an emergency
3. To equalize the flow of fluid into the actuator piston chambers
4. To allow the pilot to operate either flight control surface independently

9-16. Which of the following procedures should you follow when cleaning the piston shaft of an actuating cylinder?

1. Wipe it with engine oil
2. Wipe it with aliphatic naphtha
3. Wipe it with Freon, and then with grease
4. Wipe it with dry-cleaning solvent, and then with hydraulic fluid

9-17. In the maintenance of actuating cylinders, what is the most common trouble encountered?

1. External leakage
2. Internal leakage
3. Mechanical damage
4. Electrical damage

9-18. Hydraulic pressure is converted into rotary mechanical motion by which of the following components?

1. A hydraulic motor
2. An actuating cylinder
3. A power control cylinder
4. A control surface actuator

9-19. Hydraulic motors are commonly used to operate which of the following aircraft equipment?

1. Rudders and stabilizers
2. Radar and wing flaps
3. Speed brakes and trim tabs
4. Landing and arresting gear

9-20. What type of a valve directs pressurized fluid to one working port of an actuating cylinder and, at the same time. returns fluid to the reservoir from the other working port?

1 An automatic check valve
2. A sequence valve
3. A selector valve
4. A shuttle valve

9-21. Which of the followinq is NOT a type of selector valve?

1. Slide
2. Poppet
3. Shuttle
4. Solenoid-operated

9-22. To relieve pressure created by thermal expansion of the fluid, a system that has a balanced poppet-type selector valve must also incorporate what other type of valve?

1. A one-way check valve
2. A thermal relief valve
3. A sequence control valve
4. A manually operated relief valve

IN ANSWERING QUESTION 9-23, REFER TO FIGURE 8-8 IN THE TEXTBOOK.

9-23. The poppets of a poppet-type selector valve are actuated by what means?

1. The solenoid
2. The poppet spring
3. The return fluid pressure
4. The cams on the camshaft

9-24. To prevent overrunning, all poppet-type selector valves are provided with what integral device?

1. A stop
2. A striker plate
3. An electrical cutoff
4. A hydraulic limiting switch

9-25. When all four of the poppets of a poppet-type selector valve are held firmly seated by the springs and there is no fluid flow, the valve is in what position?

1. The return position
2. The working position
3. The neutral position
4. The pressure position

9-26. Malfunctioning selector valves are usually the result of which of the following problems?

1. Improper installation
2. Damaged parts only
3. Foreign particles only
4. Damaged parts and foreign particles

9-27. External leakage from a poppet-type selector valve could be caused by which of the following conditions?

1. A damaged O-ring packing on the poppet
2. A damaged gasket under the sealing plug
3. A damaged center packing on the camshaft
4. A damaged bottom gasket on the poppet seat

9-28. Currently, what type of selector valve is the most durable and trouble-free?

1. The slide-type
2. The poppet-type
3. The shuttle-type
4. The solenoid-type

IN ANSWERING QUESTION 9-29, REFER TO FIGURE 8-10 IN THE TEXTBOOK.

9-29. The O-rings form a seal between the sleeve and the body creating what total number of chambers around the sleeve?

1. Nine
2. Two
3. Five
4. Four

9-30. The slide-type selector valve has raised, machined portions that are known by which of the following terms?

1. Stops
2. Lands
3. Lobes
4. Retainers

9-31. A slide-type selector valve has three grooves at the end next to the eye. The grooves are known by which of the following terms?

1. Lines
2. Lands
3. Rings
4. Detents

9-32. A slide-type selector valve should have a light film of hydraulic fluid applied to the exposed areas of the slide primarily for what purpose?

1. To prevent corrosion
2. To lubricate the slide
3. To prevent external leakage
4. To prevent the entry of foreign matter

9-33. A solenoid-operated selector valve is controlled by what means?

1. Electrically
2. Mechanically
3. Hydraulically
4. Pneumatically

9-34. A solenoid-operated selector valve directs the flow of fluid to and from the actuator by the use of what component?

1. The plunger
2. The pilot slide
3. The selector slide
4. The lever assembly

9-35. A solenoid-operated selector valve controls bleed pressure by the use of what component?

1. The sleeve
2. The plunger
3. The solenoid
4. The position lock

9-36. For the proper cleaning, inspection, repair, and testing of selector valves, you should use what series of NAVAIR manuals as a guide?

1. 01 series
2. 02 series
3. 03 series
4. 04 series

9-37. When testing a solenoid selector valve, you must bleed all air from the valve before applying pressure for which of the following reasons?

1. To prevent premature operation of the solenoids
2. To ensure proper lubrication of the parts
3. To ensure proper seating of the O-rings
4. To prevent a leak from going undetected

9-38. The purpose of a check valve is to allow the fluid to flow in one direction only.

1. True
2. False

9-39. What is indicated by the arrow on the body of an automatic check valve?

1. The direction of restricted flow
2. The direction of reversed flow
3. The direction of checked flow
4. The direction of free flow

9-40. A bypass check valve differs from an automatic check valve in which of the following ways?

1. It can be manually closed to completely stop the flow of fluid in both directions
2. It can be manually opened to allow fluid to flow in both directions
3. It is automatically opened to allow fluid to flow in both directions
4. It is automatically opened to allow restricted flow in both directions

9-41. What is the most common cause for internal leakage of a check valve?

1. A broken spring in the valve
2. Foreign matter in the valve
3. Vibrations in the system
4. Water in the system

9-42. Sequence valves may be operated in which of the following ways?

1. By pressure only
2. By pressure or mechanically only
3. By pressure, mechanically, or electrically only
4. By pressure, mechanically, electrically, or pneumatically

9-43. What are the two types of mechanically operated sequence valves?

1. Equal and unequal
2. Loaded and unloaded
3. Manual and automatic
4. Balanced and unbalanced

9-44. Trouble associated with a mechanically operated sequence valve is most commonly a result of what problem?

1. Foreign matter
2. Weak valve springs
3. Faulty O-ring seals
4. Improper adjustment

9-45. A priority valve is operated by what means?

1. Manually
2. Electrically
3. Pneumatically
4. Automatically

9-46. Isolation of the normal system from the emergency hydraulic system is the main function of what valve?

1. The shuttle valve
2. The control valve
3. The priority valve
4. The isolation valve

9-47. Excessive heating of a shuttle valve is a good indication of what type of problem?

1. Internal leakage
2. External leakage
3. Improper adjustment
4. Broken mechanical linkage

9-48. An actuating units speed of operation is controlled by what component?

1. A capacitor
2. A restrictor
3. A priority valve
4. A sequence valve

9-49. To retard the action of a hydraulic cylinder by limiting the flow of fluid in both directions, you should use which of the following devices?

1. A timing valve
2. A control valve
3. A one-way restrictor
4. A two-way restrictor

9-50. When it is necessary to lower the normal operating pressure a specified amount, you should use what valve?

1. A flow control valve
2. A two-way check valve
3. A pressure reducing valve
4. A one-way restrictor valve

9-51. An automatic resetting hydraulic fuse is designed to close and shut off the flow of fluid that passes through it when which of the following problems occurs?

1. Excessive volume
2. Excessive pressure
3. Excessive temperature
4. Excessive contamination

ASSIGNMENT 10

Textbook Assignment: "Fixed-Wing Flight Control Systems," chapter 9, pages 9-1 through 9-59.

10-1. Pitch, yaw, and roll control of an aircraft are provided by what flight controls?

1. Primary
2. Backup
3. Secondary
4. Auxiliary

10-2. What type of flight control system is moved manually through a series of push-pull rods, cables, bell cranks, sectors, and idlers?

1. Mechanical (unboosted)
2. Mechanical (boosted)
3. Power-assisted
4. Power-boosted

10-3. Specifications for Navy aircraft require that the primary flight control surfaces be capable of being operated from what total number of separate hydraulic systems?

1. One
2. Two
3. Three
4. Four

10-4. An aircraft elevator control system has viscous dampers on the bobweight assemblies for what purpose?

1. To decrease control stick load
2. To reduce push-pull tube vibration
3. To retard control stick movement to prevent overcontrol
4. To help the pilot move the stick from the neutral position

10-5. To balance the forward and aft bobweights when an aircraft elevator is in a neutral position, what component is installed between the bell crank and the fin structure?

1. A load-feel bungee
2. A push-pull tube,
3. A truss assembly
4. A load spring

10-6. In the "dirty" configuration, the horizontal stabilizer provides greater aircraft control at lower airspeeds by what means?

1. The stabilizer travel is increased to 24 degrees of leading edge down
2. The stabilizer travel is increased to 24 degrees of leading edge up
3. The leading edge down is reduced by 10 degrees
4. The leading edge up is reduced by 10 degrees

10-7. Horizontal stabilizer movement is controlled only by input signals from the AFCS system when it is functioning in what mode?

1. Manual
2. Series
3. Parallel
4. Independent

10-8. To provide longitudinal trim to the aircraft, an electric trim actuator is linked to the artificial-feel bungee in what manner?

1. Electrically
2. Mechanically
3. Hydraulically
4. Pneumatically

10-9. The approach power compensator system (APC) aids the pilot in what manner?

1. It regulates the position of the flap's power mechanism during the approach for landing
2. It maintains a fixed angle of attack during landing to compensate for varying gross weight
3. It maintains a varying spoiler deflector position during landing to compensate for varying approach speeds
4. It regulates the throttle position to maintain the desired angle of attack during approaches and landings

10-10. An aircraft lateral control system incorporates a load-feel bungee in the aileron system for which of the following purposes?

1. To provide artificial feel only
2. To provide a centering device only
3. To provide artificial feel and a centering device only
4. To provide artificial feel, a centering device, and effortless control stick movement

IN ANSWERING QUESTION 10-11, REFER TO FIGURE 9-10 IN THE TEXTBOOK.

10-11. The aircraft flaperon control system has a total of how many actuators?

1. Five
2. Two
3. Three
4. Seven

10-12. Flaperon autopilot actuators are capable of operating in which of the following modes?

1. Manual only
2. Manual or series only
3. Manual, series, or parallel only
4. Manual, series, parallel, or independent

10-13. When the flaperon autopilot actuator is operating in the series mode, the AFCS can be overridden by the pilot applying what minimum amount of force to the control stick?

1. 25 lb
2. 20 lb
3. 15 lb
4. 10 lb

10-14. The combination aileron and spoiler/deflector system is used to enhance what in-flight capability of the aircraft?

1. Increased pitch control in rapid descents
2. Increased climb rate about the lateral axis
3. Increased yaw control during high-speed turns
4. Increased roll rate about the longitudinal axis

10-15. On a combination aileron and spoiler/deflector system, what is the maximum deflection of (a) the spoiler and (b) the deflector?

1. (a) 30° (b) 15°
2. (a) 40° (b) 20°
3. (a) 50° (b) 25°
4. (a) 60° (b) 30°

10-16. In a spoiler control system, spoiler action is provided by all EXCEPT which of the following components?

1. The pitch computer
2. The spoiler actuators
3. The mechanical interlock
4. The roll command transducer

10-17. In a rudder control system, the pedal position transmitter and the rudder surface transmitter function only under which of the following conditions?

1. When the automatic flight control system is disengaged
2. When the automatic flight control system is engaged
3. When the nosewheel steering system is disengaged
4. When the nosewheel steering system is engaged

10-18. The servo cylinders used in an electronic flight control system are controlled by what means?

1. Mechanical linkage
2. Electrically controlled cables
3. Electrical impulses from computers
4. Hydraulic impulses from electronic data centers

10-19. The backup flight control system reservoir has what total capacity?

1. 0.84 quart
2. 0.97 quart
3. 1.31 quarts
4. 1.75 quarts

10-20. The three-position backup system hydraulic test switch located in the cockpit is spring-loaded to what position?

1. ON
2. OFF
3. FLIGHT
4. COMBINED

10-21. Readjustment of primary flight control power actuators should be accomplished at which of the following maintenance activities?

1. Depot level only
2. Intermediate level only
3. Depot or intermediate level only
4. Depot, intermediate, or organizational level

10-22. If a jammed flight control system malfunction can NOT be duplicated or the cause determined, you should take which of the following actions?

1. Request a P&E inspection
2. Make an aircraft logbook entry
3. Make at least three penalty flights
4. Request a NADEP evaluation of the aircraft

10-23. When analyzing trouble in flight control systems, a quality assurance inspection is a must during which of the following stages of repair?

1. The testing stage
2. The completion stage
3. The repair progression stage
4. All of the above

10-24. Flutter, free play, and sluggishness of control surfaces are usually the result of which of the following problems?

1. Broken cables
2. Low cable tension
3. High cable tension
4. Freely rotating pushrods and bell cranks

10-25. Control surface throws may be measured in which of the following units?

1. Inches only
2. Inches and degrees only
3. Inches, fractions, or degrees only
4. Inches and fractions or degrees and minutes

10-26. In reference to a cable control system, which of the following statements is NOT correct?

1. Cables are rigid
2. Cables can be run over long distances
3. Cables are easily led around obstacles
4. Cables are stronger than steel rods or tubing

10-27. Cable control systems require more maintenance and must be inspected more thoroughly than rigid linkage systems.

1. True
2. False

10-28. If you find a cable that is kinked, what action should you take?

1. The kink should be noted in the aircraft logbook and the cable removed during the next periodic inspection
2. The cable should be thoroughly cleaned and the kink removed
3. The kink should be straightened and the cable lubricated
4. The cable should be replaced immediately

10-29. To replace cables in an aircraft when they are routed through inaccessible areas, you should use which of the following items?

1. A tensiometer
2. A snaking line
3. A swaging device
4. A fairlead guide

10-30. To ensure that the end fitting of a push-pull rod is NOT extended too far out of the rod, you should follow which of the following procedures?

1. Retighten the checknut
2. Measure the end fitting length
3. Count the number of end fitting turns
4. Look for the stem through the drilled hole in the rod

IN ANSWERING QUESTIONS 10-31 THROUGH 10-33, SELECT FROM COLUMN B THE COMPONENT THAT BEST MATCHES THE FUNCTION LISTED IN COLUMN A. NOT ALL ITEMS LISTED IN COLUMN B WILL BE USED.

	A. FUNCTION	B. COMPONENT
10-31.	Changes the direction of motion	1. Bungee
10-32.	Supports and guides push-pull tubes	2. Idler arm
10-33.	Protects the rigid system against damage	3. Bell crank
		4. Fitting assembly

10-34. Basically, what total number of distinct steps are there to follow in aircraft troubleshooting?

1. Ten
2. Nine
3. Three
4. Seven

10-35. A tensiometer is used to measure and check which of the following items?

1. The length of a cable
2. The breaking strength of a cable
3. The amount a cable will stretch
4. The amount of pulling force applied to a cable

IN ANSWERING QUESTION 10-36, REFER TO FIGURE 9-23 IN THE TEXTBOOK.

10-36. You are checking a l/8-inch cable using a No. 1 riser, and the dial pointer indicates 33. What is the cable tension?

1. 50 lb
2. 60 lb
3. 70 lb
4. 80 lb

10-37. Cable tensiometer readings should NOT be taken within what prescribed number of inches of turnbuckles, end fittings, or quick disconnects?

1. 5 in.
2. 2 in.
3. 6 in.
4. 4 in.

IN ANSWERING QUESTIONS 10-38 THROUGH 10-40, REFER TO FIGURE 9-26 IN THE TEXTBOOK.

10-38. You should begin rigging the system at what component?

1. The bobweight
2. The aft sector
3. The bell crank
4. The aft control stick

10-39. While rigging the elevator control system, you have the aft sector rig pin in place and you find that the elevators are 5 degrees too low. What action should you take to correct the problem?

1. Loosen the turnbuckles on the cables
2. Tighten the turnbuckles on the cables
3. Shorten the push-pull rod from the aft sector
4. Lengthen the push-pull rod from the forward sector

10-40. The maximum up and down travel of the aircraft elevators is controlled by the adjustment of which of the following components?

1. The stop bolts on the aft control stick
2. The stop bolts on the forward control stick
3. The forward push-pull tube at the aft control stick
4. The vertical reference line at the forward control stick

10-41. Aircraft control cables should NOT be cut by which of the following tools?

1. A cold chisel
2. A pair of side cutters
3. An oxyacetylene cutting torch
4. A pair of heavy-duty diagonal pliers

10-42. Swaging is the attachment of a terminal to the end of a cable by what means?

1. By soldering
2. By pressure
3. By welding
4. By heat

10-43. After a cable terminal has been swaged and measured, what manual should you consult to determine if it has been swaged sufficiently?

1. NAVAIR 01-1A-8
2. NAVAIR 01-1A-12
3. NAVAIR 01-1A-16
4. NAVAIR 01-1A-20

10-44. What amount of cable should extend through an MS 20667 terminal when you swag it with a pneumatic swagger?

1. 1/8 in.
2. 1/4 in.
3. 1/2 in.
4. 3/4 in.

10-45 Usually, wing flaps are hydraulically operated and controlled by which of the following methods?

1. Pneumatically
2. Electrically only
3. Mechanically only
4. Electrically or mechanically

10-46. In a conventional wing flap system, what condition ensures that the wing flaps will be locked in the full up position?

1. The spring pressure exerted by the follow-up pushrod
2. The flap control handle in its detent position
3. The selector valve slightly displaced from neutral
4. The selector valve in neutral

10-47. In a conventional wing flap system, a wing flap retraction shutoff valve is energized during which of the following conditions?

1. When the aircraft's weight is on its wheels
2. When the aircraft is in flight with the flaps up
3. When the aircraft is in flight with the landing gear up
4. When the aircraft is experiencing an in-flight split flap condition

10-48. Once actuated, the emergency dump valve of a conventional wing flap system must be reset by what method to restore the system to normal operation?

1. Manually
2. Electrically
3. Pneumatically
4. Hydraulically

10-49. On some aircraft, leading edge flap panels are known as slats.

1. True
2. False

10-50. In a leading/trailing edge wing flap system, what indication will appear in the windows of the flap position indicator when the flaps are in transit?

1. UP
2. DN
3. NEU
4. Barber poles

10-51. When the emergency flap system has been actuated, in what position are (a) the leading edge flaps and (b) the trailing edge flaps?

1. (a) Up (b) 1/2 down
2. (a) Up (b) full down
3. (a) 1/2 down (b) full down
4. (a) Full down (b) 1/2 down

10-52. If the combined hydraulic system fails in a semi-independent flap and slat system, what component provides for continued operation of the system?

1. An accumulator
2. A shuttle valve
3. An emergency pneumatic pump
4. An emergency electric motor

10-53. In a semi-independent flap and slat system, if the flap control handle is moved to the takeoff position, a limit switch will halt flap movement at what position?

1. 10°
2. 20°
3. 30°
4. 40°

10-54. The slat system provides which of the following aerodynamic features?

1. Higher takeoff speeds
2. Increased turning radius
3. Additional lift and stability at lower speeds
4. Additional lift and stability at higher speeds

10-55. Direct lift control (DLC) is incorporated into some aircraft to perform what function?

1. To decrease the vertical descent rate of the aircraft during landings
2. To increase the vertical descent rate of the aircraft during landings
3. To decrease the ascent rate of the aircraft during takeoffs
4. To increase the ascent rate of the aircraft during takeoffs

10-56. What component in a wing surface control system ensures symmetrical operation of the wings?

1. A flow divider
2. A sweep control box
3. An air data computer
4. A synchronizing shaft

10-57. Minimum wing sweep limiting is NOT available under what method of control?

1. Automatic
2. Mechanical
3. Electronic
4. Bomb manual

10-58. Aircraft that incorporate fuselage type speed brakes have an interconnect between the left-hand speed brake and the elevator nose down control cable for what purpose?

1. To stabilize aircraft yaw when the speed brakes are actuated
2. To prevent the aircraft from assuming a nose up attitude when the speed brakes are extended
3. To prevent the aircraft from assuming a nose down attitude when the speed brakes are extended
4. To assist the pilot in bringing the nose of the aircraft up when the speed brakes are applied

10-59. To allow for automatic retraction under high air loads, what type of valve is installed in a fuselage speed brake system?

1. A check valve
2. A restrictor valve
3. A blow-back relief valve
4. A solenoid control valve

10-60. During a malfunction, the null detector of the wingtip speed brake system causes the speed brakes to close when they reach what maximum amount of disparity?

1. 8°
2. 12°
3. 15°
4. 21°

10-61. A trim system is provided for the pilot to lessen the need for a constant effort to maintain the desired heading and altitude.

1. True
2. False

10-62. When the AFCS is engaged, what type of input controls the trim actuator in the aileron trim control system?

1. Hydraulic
2. Pneumatic
3. Electrical
4. Mechanical

10-63. A longitudinal trim actuator has what total number of operating speeds?

1. One
2. Two
3. Five
4. Four

10-64. The proper operation of gearboxes, interconnecting splined shafts, and screw jack actuators is essentially dependent upon which of the following maintenance functions?

1. Correct alignment
2. Correct adjustment
3. Proper lubrication
4. Proper installation

10-65. During the repair process for flap hydraulic components, you should verify spring alignment by performing which of the following procedures?

1. Testing them with a load tester
2. Rolling them on a smooth, flat surface
3. Rolling them on a smooth, curved surface
4. Testing them with a spring alignment tester

10-66. When a wing or stabilizer has been removed from an aircraft, it should be sent to what type of repair facility?

1. Organizational-level
2. Intermediate-level
3. Manufacturer
4. Depot-level

10-67. Which of the following tools are recommended for the removal of wing structural bolts?

1. A mallet and brass drift pin
2. A ball peen hammer and chisel
3. A setting hammer and prick punch
4. A sledge hammer and sheet metal punch

10-68. Before disconnecting cable linkage from flight control surfaces, you should perform what function first?

1. Jack the aircraft
2. Relieve the tension
3. Collapse the struts
4. Apply hydraulic power

10-69. Tolerances for balanced flight control surfaces are specified in what publication?

1. The NATOPS
2. The NAMP
3. The IPB
4. The SRM

10-70. An alignment check of the airframe should be made if an aircraft has experienced which of the following conditions?

1. Excessive g acceleration
2. Extensive damage
3. A hard landing
4. All of the above

10-71. What method(s) of aircraft leveling is/are the most accurate?

1. Spirit
2. Transit
3. Suspension
4. Plumb bob and datum plate

10-72. For acceptable aerodynamic tolerances, the left- and right-hand wing twist must be within what maximum readings?

1. 1°, 12 min
2. 2°, 12 min
3. 3°, 12 min
4. 0°, 12 min

ASSIGNMENT 11

Textbook Assignment: "Rotary-Wing Flight Control Systems," chapter 10, pages 10-1 through 10-20, and "Aircraft Wheels, Tires, and Tubes," chapter 11, pages 11-1 through 11-28.

11-1. The word "helicopter" means helical wing, which comes from what language?

1. Greek
2. French
3. Hebrew
4. Italian

11-2. Helicopter lift is provided by what means?

1. The engines
2. The fixed wings
3. The rotor blades
4. The fuselage design

11-3. Rotor blades that are highly polished will reduce which of the following forces?

1. Lift
2. Drag
3. Speed
4. Velocity

11-4. Rotor blade dissymmetry is created by what means?

1. By horizontal flight only
2. By hovering in a wind condition only
3. By horizontal flight or hovering in a wind condition
4. By hovering in a no-wind condition

11-5. What method corrects dissymmetry by equalizing lift?

1. Coning
2. Fluttering
3. Autorotating
4. Blade flapping

11-6. What type of main rotor allows each of its blades to move vertically and horizontally?

1. A hinged rotor
2. A horizontal rotor
3. An adjustable rotor
4. An articulated rotor

11-7. The maximum ground cushion effect is achieved during what condition?

1. 0 knots
2. 7 knots
3. 12 knots
4. 15 knots

11-8. What is the most common type of helicopter?

1. Dual main rotor
2. Single main rotor
3. Tandem main rotor
4. Coaxial main rotor

11-9. The lateral movement of a helicopter is controlled by which of the following systems?

1. Cyclic only
2. Collective only
3. Cyclic and collective only
4. Cyclic, collective, and rotary rudder

11-10. The friction lock on a helicopter's collective stick is used for which of the following purposes?

1. To provide feel when operating the controls only
2. To prevent the stick from creeping during flight only
3. To provide feel when operating the controls and to prevent the stick from creeping during flight
4. To provide a means of locking the main rotor assembly when parking the helicopter in high winds

11-11. The negative force gradient spring on a rotary rudder control system is preloaded to what maximum amount of force?

1. 500 lb
2. 600 lb
3. 700 lb
4. 800 lb

11-12. What component integrates collective pitch control movements with fore and aft, lateral, and directional movements?

1. The auxiliary servo cylinder
2. The primary servo cylinder
3. The rotor servo
4. The mixing unit

11-13. During a power failure, what, if anything, happens to the primary servo cylinders?

1. They are bypassed
2. They function as control rods only
3. They operate at a reduced rate of speed
4. Nothing

11-14. What component(s) allow(s) the swashplate to tilt off of its horizontal plane and move on its vertical axis?

1. The nutating plate
2. The universal joint
3. The ball ring and socket
4. The constant velocity joint

11-15. Which, if any, of the following solvents is authorized for cleaning rotary-wing and rudder blades?

1. Naphtha
2. Lacquer thinner
3. Carbon tetrachloride
4. None of the above

11-16. Proper blade tracking prevents which of the following problems?

1. Flexing
2. Vibration
3. Overlapping
4. Dissymmetry of lift

11-17. Which of the following types of blade tracking devices can be used in flight or on the ground?

1. Static
2. Dynamic
3. Strobex
4. Hydrostatic

11-18. A rotor brake assembly is comparable to which of the following wheel brake assemblies?

1. Single disc
2. Multiple disc
3. Segmented rotor
4. Expandable tube

11-19. What is the minimum pressure required to effectively operate the rotor brake?

1. 320 psi
2. 370 psi
3. 410 psi
4. 450 psi

11-20. When blade folding is performed, what is the condition of (a) the engine and (b) the rotary-wing head?

1. (a) Stopped
   (b) stopped
2. (a) Stopped
   (b) operating
3. (a) Operating
   (b) stopped
4. (a) Operating
   (b) operating

11-21. What flight control device(s) may have to be moved around the neutral position to engage the control lockpin?

1. The pilot's foot pedals
2. The cyclic control stick
3. The copilot's foot pedals
4. The collective control stick

IN ANSWERING QUESTIONS 11-22 THROUGH 11-25, SELECT FROM COLUMN B THE BLADE FOLDING SYSTEM COMPONENT THAT MATCHES THE FUNCTION LISTED IN COLUMN A.

	A. FUNCTION	B. COMPONENT
11-22.	Prevents pressure from entering the blade fold system during flight	1. Blade fold accumulator
11-23.	Transfers fluid to the rotary-wing head for folding	2. Control lock cylinder
11-24.	Dampens out pressure surges during the fold and spread cycles	3. Rotor coupling
11-25.	Locks the flight controls during the fold cycle	4. Safety valve

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11-26. What is the normal time for blade folding?

1. 12 to 15 sec
2. 15 to 21 sec
3. 22 to 37 sec
4. 27 to 41 sec

11-27. Aircraft wheels are made from which of the following types of metal?

1. Steel
2. Aluminum alloy only
3. Magnesium alloy only
4. Aluminum or magnesium alloys

11-28. The flange of a remountable flange wheel is held in place by what component?

1. A locknut
2. A lockring
3. A locking pin
4. A locking key

IN ANSWERING QUESTION 11-29, REFER TO FIGURE 11-3 IN THE TEXTBOOK.

11-29. Which of the following components have been installed on the aircraft wheels to allow the attachment of braking components?

1. The drive keys
2. The bearing cups
3. The fusible plug
4. The remountable flange lock

11-30. Which of the following conditions is a major cause of rejection or failure of aircraft wheels?

1. Crashes
2. Blowouts
3. Normal wear
4. Loss of lubrication

11-31. Aircraft bearings should be cleaned in what type of solvent?

1. Fuel
2. Freon
3. P-D-680
4. Naphtha

11-32. You should presoak felt qrease retainers in which of the following substances?

1. VV-L-800
2. Engine oil
3. MIL-G-81322
4. Hydraulic fluid

IN ANSWERING QUESTION 11-33, REFER TO FIGURE 11-6 IN THE TEXTBOOK.

11-33. During tire inflation, the setting on the pressure regulator should NEVER exceed what pressure?

1. 800 psi
2. 700 psi
3. 600 psi
4. 500 psi

11-34. Information on cleaning aircraft wheels can be found in which of the following publications?

1. NAVAIR 01-1A-1
2. NAVAIR 04-10-1
3. NAVAIR 04-10-506
4. NAVAIR 04-10-508

11-35. An aircraft wheel assembly with a partially melted fuse plug is NOT a reason for rejection.

1. True
2. False

11-36. A defect in a wheel rim is NOT considered significant unless it is deeper than what prescribed depth?

1. 0.010 in.
2. 0.015 in.
3. 0.017 in.
4. 0.020 in.

IN ANSWERING QUESTIONS 11-37 THROUGH 11-40, SELECT FROM COLUMN B THE AIRCRAFT TIRE SECTION DESCRIBED IN COLUMN A.

	A. DESCRIPTION	B. TIRE SECTION
11-37.	Multiple layers of nylon with individual cords arranged parallel to each other	1. Chafing strips
11-38.	Surface that contacts the ground	2. Cord Body
11-39.	Outer layer of rubber adjoining the tread and extending to the beads	3. Tread
11-40.	Provide additional rigidity to the bead	4. Sidewall

11-41. Which of the following tread patterns or designs is NOT used on naval aircraft?

1. Plain
2. Ribbed
3. Twisted
4. Nonskid

11-42. Each rebuilt aircraft tire receives a final nondestructive inspection by the use of what method?

1. Visual
2. Electromagnetic
3. Penetrating radiation
4. Laser beam optical holographic

IN ANSWERING QUESTION 11-43, REFER TO FIGURE 11-14 IN THE TEXTBOOK.

11-43. What total number of times has this tire been rebuilt?

1. One
2. Two
3. Five
4. Four

11-44. The vent holes in tubeless tires are marked with what color dots?

1. Red
2. Green
3. White
4. Aluminum

11-45. A tire and wheel assembly should be removed from an aircraft and sent to AIMD if it shows a repeated pressure loss exceeding what prescribed percent of the correct operating inflation pressure?

1. 5%
2. 10%
3. 12%
4. 15%

11-46. The slippage mark on an aircraft tire should be inspected for slippage on the rim at what maximum interval?

1. Once a week
2. Once a month
3. After 10 flights
4. After each flight

11-47. Because of long intervals between tire changes, extra care is required when you are inspecting mounted tires on fixed-wing carrier-based aircraft.

1. True
2. False

11-48. Before disassembling a wheel assembly, what is the first thing you should do?

1. Break the tire bead
2. Remove the wheel flange
3. Check the tire for cuts
4. Ensure the tire is completely deflated

11-49. Which of the following tire bead-breaking machines is intended for shipboard use?

1. Lee-I
2. Lee-II
3. Lee-IX
4. Lee-XX

11-50. The inner tube of a tube-type aircraft tire may be reused if it is in good condition and less than what total number of years old?

1. 5 yr
2. 6 yr
3. 7 yr
4. 8 yr

11-51. Before inserting an inner tube into a tire, you should sprinkle it which of the following substances?

1. Flour
2. Water
3. Cornstarch
4. Talcum powder

11-52. What procedure should you use to identify a tubeless tire?

1. Check the inside of the tire for an orange stripe
2. Check to make sure the word “tubeless” is stamped on the sidewall
3. Check to make sure the manufacturer’s mold number is preceeded with the letter X
4. Check the tire’s serial number with the list of tubeless tire serial numbers

11-53. The remote tire inflator assembly should be calibrated upon initial receipt, before being placed into service, and at what other maximum interval?

1. Every month
2. Every 2 months
3. Every 3 months
4. Every 6 months

11-54. You have inflated a tube-type tire to its maximum operating pressure. The tire must remain at this pressure for what minimum length of time before you check it for a pressure loss?

1. 10 min
2. 7 min
3. 5 min
4. 4 min

11-55. What code is used to condemn a nonretreadable tire?

1. C
2. H
3. N
4. R

11-56. What solution should you use to clean oil or grease from a tire?

1. P-D-680
2. Jet fuel
3. Kerosene
4. Soap and water

IN ANSWERING QUESTIONS 11-57 THROUGH 11-59, SELECT FROM COLUMN B THE MOST PROBABLE CAUSE FOR THE AIRCRAFT TIRE/WHEEL DEFECT LISTED IN COLUMN A. NOT ALL ITEMS IN COLUMN B WILL BE USED.

	A. DEFECT	B. CAUSE
11-57.	Rapid and uneven wear at the outer edges	1. Over-inflated
11-58.	Thumping during takeoff	2. Under-inflated
11-59.	Excessive wear at one spot	3. Nylon flat spot
		4. Wheel out of balance

11-60. Which of the following types of inner tubes has radial vent ridges molded on the surface?

1. Type I
2. Type II
3. Type III
4. Type IV

ASSIGNMENT 12

Textbook Assignment: "Landing Gear, Brakes, and Hydraulic Utility Systems," chapter 12, pages 12-1 through 12-79.

12-1. What is the most common type of landing gear used on naval aircraft?

1. Bicycle
2. Tricycle
3. Inverted
4. Indented

12-2. When the landing gear is fully retracted in a typical aircraft landing gear system, the up lock mechanism is actuated by what means?

1. Electrically
2. Mechanically
3. Hydraulically
4. Pneumatically

IN ANSWERING QUESTION 12-3, REFER TO FIGURE 12-4 IN THE TEXTBOOK.

12-3. After the locks are disengaged in the emergency landing gear extension system, what force(s) extend(s) the main gear?

1. Gravity only
2. Nitrogen only
3. Hydraulic pressure only
4. Gravity, nitrogen, and hydraulic pressure

12-4. An up lock switch is installed on each main landing gear door latch to provide (a) what indication and (b) in what location?

1. (a) Main-gear-down
   (b) wheel well
2. (a) Main-gear-up
   (b) wheel well
3. (a) Main-gear-down
   (b) cockpit
4. (a) Main-gear-up
   (b) cockpit

12-5. The distance that the landing gear doors will open or close depends upon which of the following factors?

1. The volume of hydraulic fluid used
2. The amount of pneumatic pressure exerted
3. The length of the door linkage and the adjustment of the doorstops
4. The amount of material trimmed from the doors and the length of throw of the latch cylinder

IN ANSWERING QUESTION 12-6, REFER TO FIGURE 12-8 IN THE TEXTBOOK.

12-6. The rate of fluid flow from the lower chamber to the upper chamber of the landing gear shock strut is controlled by what component?

1. The air valve
2. The torque arm
3. The metering pin
4. The orifice plate

IN ANSWERING QUESTION 12-7, REFER TO FIGURE 12-10 IN THE TEXTBOOK.

12-7. When the nose gear shock strut is fully extended, the wheel and axle assembly is aligned in the straight ahead position by which of the following components?

1. The cylinder
2. The torque arm
3. The centering cams
4. The fork and axle assembly

12-8. The landing gear drag brace is hinged at the center for which of the following reasons?

1. To facilitate maintenance
2. To facilitate proper inspections
3. To permit the brace to jackknife during gear extension
4. To permit the brace to jackknife during gear retraction

12-9. Hydraulically actuated nosewheel steering systems are controlled by which of the following methods?

1. Manually
2. Electrically only
3. Mechanically only
4. Electrically or mechanically

12-10. In a nosewheel steering system, what component generates an electrical signal proportional to the amount of rudder pedal deflection?

1. The feedback potentiometer
2. The command potentiometer
3. The steering transducer
4. The steering amplifier

12-11. You are performing an operational check on the nosewheel steering system with the nose gear turned to 30° right of center. What action, if any, will occur when you extend the arresting gear?

1. It will return to the center position
2. It will move 1 inch right of center
3. It will move 1 inch left of center
4. None

12-12. When adjusting the nosewheel steering amplifier, which of the following procedures should you perform?

1. Operate the steering switch
2. Insert rigging pin No. 1 into the rudder pedal linkage
3. Check to see that the gear centers within 2° of center index mark
4. Each of the above

12-13. When the steering dampener assembly of a mechanically controlled nose steering system is sent to the intermediate level of maintenance, which of the following bench tests are performed with the unit in neutral while the return leakage is being measured?

1. The no steer test
2. The output torque test
3. The stall leakage test
4. The steering resolution test

12-14. During an aircraft landing gear drop check, what is the maximum (a) pressure and (b) gallons per minute of hydraulic fluid required to retract and lock the gear?

1. (a) 1800 psi (b) 4 gpm
2. (a) 2000 psi (b) 2 gpm
3. (a) 2400 psi (b) 3 gpm
4. (a) 3000 psi (b) 4 gpm

12-15. When you are performing an emergency extension of the landing gear during a drop check, the force required to push the main landing gear to the locked position at the axle hub should NOT exceed what maximum amount?

1. 50 lb
2. 20 lb
3. 30 lb
4. 40 lb

12-16. A significant number of unsafe or hung landing gear discrepancies are caused by which of the following maintenance related problems?

1. Improper rigging only
2. Improper adjustment of linkages only
3. Improper rigging or improper adjustment of linkages only
4. Improper rigging, improper adjustment of linkages, or factory defective parts

12-17. You can release the nitrogen pressure from a shock strut by which of the following means?

1. Removing the valve core
2. Depressing the valve core
3. Turning the valve swivel nut clockwise
4. Turning the valve swivel nut counterclockwise

12-18. When removing a shock strut from an aircraft, you should remove the wheel and brake assembly to reduce the weight and allow for easier handling.

1. True
2. False

12-19. To ensure complete compression when deflating a typical shock strut, you may need to perform which of the following functions?

1. Rock the aircraft
2. Hoist the aircraft
3. Lower the arresting gear
4. Bleed the landing gear accumulator

12-20. When reinstalling an air valve assembly with a new O-ring into a shock strut, you should tighten the air valve body hex nut to what specified torque?

1. 30 to 40 in.-lb
2. 40 to 65 in.-lb
3. 100 to 110 in.-lb
4. 120 to 135 in.-lb

12-21. You can usually stop excessive fluid leakage from a shock strut by deflating the strut and performing which of the following functions?

1. Inflating the strut to 1 1/2 times its normal pressure for 48 hours
2. Tightening the packing gland nut
3. Replacing all of the packings
4. Overhauling the strut

12-22. When a strut assembly is sent to an intermediate level maintenance facility, what is the first step taken in the disassembly process?

1. The inner cylinder is withdrawn from the outer cylinder
2. All pressure is exhausted from the strut
3. The air valve assembly is removed
4. The hydraulic fluid is drained

12-23. When inspecting a strut assembly at an intermediate maintenance activity, what tool should you use to check the bearings for residual magnetism?

1. A dial indicator
2. A mattock
3. A compass
4. A magnet

12-24. When the specific torque values for strut assembly threaded parts are NOT specified in the 03 manual or MIM, what publication should you consult?

1. NAVAIR 01-1A-509
2. NAVAIR 01-1A-16
3. NAVAIR 01-1A-12
4. NAVAIR 01-1A-8

12-25. You are bench testing a strut assembly that has been serviced with fluid and nitrogen. To ensure that the strut shows no leakage, you should allow the strut to remain pressurized for what minimum number of minutes?

1. 15 min
2. 30 min
3. 45 min
4. 60 min

12-26. What type of brake system has its own reservoir and is completely separate from the aircraft's main hydraulic system?

1. The detached system
2. The power boost system
3. The independent-type system
4. The power brake control valve system

12-27. Fluid is routed to a Goodyear master cylinder by (a) what method and from (b) what source?

1. (a) Gravity
   (b) external reservoir
2. (a) Gravity
   (b) internal reservoir
3. (a) Hydraulic pump
   (b) external reservoir
4. (a) Hydraulic pump
   (b) internal reservoir

12-28. An independent-type brake system employing a Goodyear master cylinder must be bled by what method?

1. Top Up
2. Top down
3. Bottom up
4. Bottom down

12-29. In a power boost brake system, main hydraulic system pressure is used for what purpose?

1. To assist in pedal movement only
2. To operate the emergency system only
3. To assist in pedal movement and operate the emergency system only
4. To assist in pedal movement, operate the emergency system, and actuate the brake cylinders

12-30. Which of the following types of aircraft would normally use a power brake control valve system?

1. A-4
2. T-2
3. F-18
4. C-130

12-31. The brake pedal linkage of a power brake control valve (pressure ball check type) system is connected to the control valve by what component?

1. A link
2. A shackle
3. A tuning fork
4. A piston shaft

IN ANSWERING QUESTION 12-32, REFER TO FIGURE 12-28 IN THE TEXTBOOK.

12-32. In a power brake control valve (sliding spool type) system, what component(s) provide(s) feel to the brake pedal?

1. The large spring only
2. The small spring only
3. The small spring and the spool return spring only
4. The small spring, the spool return spring, and the large spring

12-33. What is the purpose of a brake debooster cylinder?

1. To increase the pressure and decrease the volume of fluid flow to the brake
2. To decrease the pressure and increase the volume of fluid flow to the brake
3. To decrease both the pressure and the volume of fluid flow to the brake
4. To increase both the pressure and the volume of fluid flow to the brake

12-34. What type of brake assembly is normally used on a medium-sized aircraft?

1. Dual disc
2. Single disc
3. Segmented rotor
4. Multiple/trimetallic disc

12-35. The brake linings of a single disc brake assembly are known by what term?

1. Discs
2. Pucks
3. Rotors
4. Plates

12-36. A dual disc brake assembly has what total number of brake linings (pucks)?

1. 10
2. 12
3. 16
4. 20

12-37. To give correct clearances between the rotating and stationary discs in a multiple/trimetallic brake system, what device traps a predetermined amount of fluid in the brake?

1. The stator
2. The backup ring
3. The annular piston
4. The automatic adjuster

12-38. In an independent brake system, the reservoir fluid level is checked by what means?

1. A dip stick
2. A sight gauge
3. A cockpit indicator
4. A lower ring in the filler neck

12-39. To perform an operational check on the emergency brake system, what source of external power, if any, is required?

1. Pneumatic
2. Hydraulic
3. Electrical
4. None

12-40. You are checking the brake lining wear of a disassembled brake assembly. What is the minimum allowable thickness of any one lining (puck) before the entire set must be replaced?

1. 1/64 in.
2. 1/32 in.
3. 1/16 in.
4. 1/8 in.

12-41. What factor(s) generally determine(s) the method you should use for bleeding brake systems?

1. The amount of air in the system
2. The type and design of the brake system to be bled
3. The means by which the brake is mounted on the strut
4. The type of main hydraulic system used in the aircraft

12-42. An overheated wheel brake assembly should be allowed to cool in the ambient air for what prescribed amount of time?

1. 45 to 60 min
2. 35 to 45 min
3. 30 to 40 min
4. 15 to 25 min

12-43. The independent brake system reservoir leakage test is performed by connecting a source of air to the filler port at what prescribed pressure?

1. 25 psi
2. 30 psi
3. 35 psi
4. 50 psi

12-44. To perform an operational test on a power brake valve, you must have a test stand capable of supplying what minimum amount of hydraulic pressure?

1. 1500 psi
2. 2000 psi
3. 3000 psi
4. 4500 psi

12-45. When you are performing an operational test on a power/manual brake valve, the hydraulic fluid must be within what prescribed temperature range?

1. 40° to 90°F
2. 55° to 100°F
3. 70° to 110°F
4. 85° to 130°F

12-46. Before disassembling a master brake cylinder, what device should you install on the end of the piston rod to prevent personal injury?

1. A nut
2. A clamp
3. A rig pin
4. A spring compressor

12-47. During the reassembly of a master brake cylinder, what type of lubricant should you apply to the suspension rod end bearing?

1. Oil
2. Wax
3. Grease
4. Hydraulic fluid

12-48. Excessive heating of a shuttle valve is an indication of what problem?

1. External leakage
2. Internal leakage
3. Defective emergency accumulator
4. Excessive cycling of the emergency pump

12-49. When performing a thermal crack test on an automatic brake adjuster valve, you should crack the valve at what prescribed pressure range?

1. 12 to 17 psi
2. 20 to 29 psi
3. 30 to 37 psi
4. 41 to 45 psi

12-50. After disassembling a brake selector valve you should clean the parts in which of the following substances?

1. Freon
2. Hydraulic fluid
3. Aliphatic naphtha
4. Dry-cleaning solvent

12-51. During a bench test, what is the maximum allowable torque required to rotate the swivel?

1. 30 in.-lb
2. 40 in.-lb
3. 50 in.-lb
4. 60 in.-lb

IN ANSWERING QUESTION 12-52, REFER TO FIGURE 12-47 IN THE TEXTBOOK.

12-52. When the brakes are released, what component prevents the piston from returning to its original position?

1. The spring guide
2. The adjusting pin
3. The return spring
4. The retaining ring

12-53. The tapered grip method is used to restrict the movement of the captured torquing-type automatic adjuster?

1. True
2. False

IN ANSWERING QUESTION 12-54, REFER TO FIGURE 12-51 IN THE TEXTBOOK.

12-54. The disc guide lining is attached to the disc guide by which of the following items?

1. Nuts
2. Pins
3. Bolts
4. Rivets

12-55. When pressure testing a dual disc brake assembly for leaks, you should hold the test pressure for what total number of minutes?

1. 5 min
2. 2 min
3. 3 min
4. 4 min

12-56. During brake application in a trimetallic disc brake assembly, the braking force is directly transmitted to which of the following components?

1. The brake pistons
2. The rotating disc
3. The self-adjusting mechanism
4. The pressure plate subassembly

12-57. The rotating disc of a trimetallic disc brake must be replaced if it is worn below what prescribed thickness?

1. 0.1 in.
2. 0.2 in.
3. 0.3 in.
4. 0.4 in.

12-58. You are testing a trimetallic disc brake and have 90 psi applied to the brake assembly. What is the minimum clearance you must have between the pressure plate and the first rotating disc?

1. 0.045 in.
2. 0.055 in.
3. 0.065 in.
4. 0.075 in,

12-59. What integral type of arresting hook has a Metco-coated hook point?

1. Type I
2. Type II
3. Type III
4. Type IV

12-60. An arresting gear detachable hook point should be removed and inspected after what total number of arrestments?

1. 10
2. 12
3. 15
4. 25

12-61. What is the maximum operating pressure within a liquid centering spring assembly when it is bottomed out?

1. 1,000 psi
2. 10,000 psi
3. 20,000 psi
4. 50,000 psi

12-62. The arresting hook assembly must be lowered to adjust the liquid centering spring.

1. True
2. False

12-63. In a catapult system, the launch bar moves down and encloses the two horns on the nose gear axle beam enabling what action to take place?

1. The launch bar to remain straight
2. The launch bar to steer the nose gear
3. The launch bar to be attached to the tension bar
4. The launch bar to be locked in the extend position

12-64. If automatic retraction fails, what components will raise the launch bar to the retracted position?

1. The leaf springs
2. The coil springs
3. The locking fingers
4. The nose axle beam horns

12-65. You are performing an operational test of the air refueling probe system. What is the prescribed time range for the complete (a) extension cycle and (b) retraction cycle?

1. (a) 1 to 3 sec
   (b) 4 to 7 sec
2. (a) 2 to 5 sec
   (b) 5 to 9 sec
3. (a) 3 to 5 sec
   (b) 6 to 8 sec
4. (a) 5 to 7 sec
   (b) 9 to 11 sec

12-66. In a wing fold system, what device prevents the wing fold handle from moving past the first stop when you are folding the wings?

1. A hydraulic lock at the wing lock cylinder
2. A hydraulic lock at the wing fold cylinder
3. A spring-loaded mechanical latch at the wing lock cylinder
4. A spring-loaded mechanical latch at the wing fold cylinder

12-67. In a wing fold system, the spring-loaded check ball of the thermal relief valve reseats at what prescribed pressure?

1. 4,150 psi
2. 3,970 psi
3. 3,590 psi
4. 3,360 psi

12-68. If the wing lock warning flags in a wing fold system fail to retract, you should consider this an indication of what problem?

1. The lockpins are failing to properly enter the lock fittings
2. The wing lock timer valve is not functioning
3. The hydraulic system pressure is insufficient
4. The wing fold cylinder is defective

12-69. In an ac generator drive system (hydraulically operated), when the return fluid exits the motor, it is routed through a heat exchanger and is cooled by what means?

1. By fuel
2. By ram air
3. By a compressor
4. By an electrically driven blower unit

12-70. To prevent overtemperature and/or reverse airflow in the engine compartment, the variable bypass bellmouth system is supplemented at low airspeeds and during ground operations by which of the following units?

1. The bellmouth ring
2. The aft variable ramp
3. The auxiliary air doors
4. The front variable ramp

12-71. When the control valve is in the neutral position in a bomb bay system, the doors are held closed by what means?

1. A check valve
2. Mechanical locks
3. Hydraulic pressure
4. A hydraulic lock valve

12-72. When you are adjusting the blades to the parking area in a windshield wiper system, rotating a blade one serration will equal approximately how many degrees of rotation?

1. 10°
2. 2°
3. 3°
4. 5°

ASSIGNMENT 13

Textbook Assignment: "Aircraft Metallic Repair," chapter 13, pages 13-1 through 13-53, and "Aircraft Nonmetallic Repair," chapter 14, pages 14-1 through 14-48.

13-1. Mallet heads are constructed from all EXCEPT which of the following materials?

1. Brass
2. Steel
3. Rawhide
4. Plastic

13-2. The shape of the bucking bar to be used on a particular riveting job is determined by which of the following factors?

1. The size of the rivets to be driven
2. The location of the rivets to be driven only
3. The accessibility of the rivets to be driven only
4. The location and accessibility of the rivets to be driven

13-3. Machine countersinking is used to flush rivet sheets of what minimum thickness?

1. 0.064 in.
2. 0.060 in.
3. 0.055 in.
4. 0.048 in.

IN ANSWERING QUESTIONS 13-4 THROUGH 13-6, SELECT FROM COLUMN B THE RIVET GUN THAT MATCHES ITS USE LISTED IN COLUMN A. NOT ALL ITEMS LISTED IN COLUMN B WILL BE USED.

A. USE	B. RIVET GUN
13-4. Used in confined spaces	1. Squeeze riveter
13-5. Used for heavy riveting	2. Corner riveter
13-6. Used for driving medium-sized rivets	3. One-shot gun
	4. slow-hitting gun

13-7. The dies of hot dimpling machines are maintained at a specific temperature by which of the following devices?

1. Hot air machines
2. Steam generators
3. Electric heaters
4. Catalytic converters

13-8. Squaring shears can be used to perform all EXCEPT which of the following cutting operations?

1. Squaring
2. Notch cutting
3. Multiple cutting
4. Cutting to a line

13-9. Which of the following sheet metal bending equipment has a series of removable fingers of varying widths?

1. A box and pan brake
2. A cornice brake
3. A bar folder
4. A bench vise

13-10. To allow the lines to stand out more clearly when laying out sheet metal patterns, you should use which of the following items?

1. A felt marker
2. Layout fluid
3. A ball-point pen
4. A graphite pencil

IN ANSWERING QUESTION 13-11, REFER TO FIGURE 13-30 IN THE TEXTBOOK.

13-11. The longer part of a formed angle is known by what term?

1. Leg
2. Flat
3. Flange
4. Bend line

13-12. You can hand form sheet metal by using which of the following devices?

1. A bar folder
2. A cornice brake
3. A box and pan brake
4. A stake plate and stakes

13-13. When hand forming a convex bend where no wrinkles or marring is allowed, you should use a vise, forming block, and which of the following tools?

1. A lead bar
2. A steel bar
3. A plastic mallet
4. A rawhide mallet

13-14. Which of the following rotary machine–rolling operations is generally the most difficult to perform?

1. Wiring
2. Beading
3. Burring
4. Crimping

13-15. When using flush-head rivets, you are required to have what minimum edge distance?

1. 1 1/2 times the rivet length
2. 2 1/2 times the rivet length
3. 1 1/2 times the rivet diameter
4. 2 1/2 times the rivet diameter

IN ANSWERING QUESTION 13-16, REFER TO TABLE 13-2 IN THE TEXTBOOK.

13-16. To properly drill a hole for a 1/8-inch rivet, you should use what number drill bit?

1. No. 11
2. No. 21
3. No. 30
4. No. 41

13-17. You are using a CP350 blind rivet pull tool and want to change the rivets from universal heads to countersunk heads without changing the rivet diameter. Which of the following blind rivet pull tool components will you need to change?

1. The chuck jaws
2. The outer anvil
3. The inner anvil
4. The inner anvil thrust bearing

13-18. The installation, inspection, and removal procedures for cherrylock rivets are basically the same for which of the following types of rivets?

1. Huck
2. Flush
3. Solid
4. Hi-shear

IN ANSWERING QUESTIONS 13-19 THROUGH 13-21, SELECT FROM COLUMN B THE TYPE OF DAMAGE THAT BEST DESCRIBES THE CAUSE LISTED IN COLUMN A. NOT ALL ITEMS LISTED IN COLUMN B WILL BE USED.

	A. CAUSE	B. DAMAGE
13-19.	Hard landings or violent maneuvers	1. Combat
		2. Stress
13-20.	Small cracks resulting from vibration	3. Fatigue
		4. Foreign
13-21.	Tools or hardware left adrift around turning engines	

13-22. You are investigating the damage to an aircraft caused by a fire. To determine if the aircraft's metal has lost any of its strength characteristics, you should use which of the following inspection methods?

1. NDI
2. Hardness testing
3. Visual inspection
4. Inspection for cracks

IN ANSWERING QUESTIONS 13-23 THROUGH 13-25, SELECT FROM COLUMN B THE DAMAGE CLASSIFICATION THAT BEST MATCHES THE REPAIR LISTED IN COLUMN A. NOT ALL ITEMS LISTED IN COLUMN B WILL BE USED.

	A. REPAIR	B. DAMAGE
13-23.	Splice a new section in the damaged area	1. Negligible damage
		2. Damage requiring replacement
13-24.	Remove a small dent from the damaged area	3. Damage repairable by patching
13-25.	Install new metal to reinforce the damaged area	4. Damage repairable by insertion

13-26. When several replacement parts need to be fabricated, which of the following items should you use to speed production time and ensure a high degree of uniformity?

1. Designs
2. Drawings
3. Templates
4. Blueprints

13-27. A skin repair to a semicritical area of an aircraft requires what percentage of the damaged area's original strength to be replaced?

1. 50%
2. 60%
3. 70%
4. 80%

13-28. The edges of a lap patch are normally chamfered to what degree of angle?

1. 45°
2. 49°
3. 55°
4. 63°

13-29. Generally, when fabricating a flush patch, you should have what maximum clearance between the skin and the filler?

1. 1/4 in.
2. 1/8 in.
3. 1/16 in.
4. 1/32 in.

13-30. When performing a flush access door installation to attach the cover plate to the doubler, you should use what type of fasteners?

1. Rivnuts
2. Hi-lok rivets
3. Machine screws
4. Flush head jo-bolts

13-31. When an aircraft skin is being replaced without the use of a template, which of the following methods of marking the new skin should NOT be used to duplicate the rivet holes in the old section?

1. A scriber
2. A hole finder
3. A soft pencil
4. A transfer punch and hammer

IN ANSWERING QUESTION 13-32, REFER TO FIGURE 13-67 IN THE TEXTBOOK.

13-32. What is the minimum length for the reinforced splice?

1. Four times the length of the leg of the stringer for each side of the damaged area
2. Four times the width of the leg of the stringer for each side of the damaged area
3. Two times the length of the filler splice
4. Two times the width of the filler splice

13-33. What structures serve to transmit stresses from the aircraft's skin and are used to give shape and rigidity?

1. Ribs
2. Spars
3. Bulkheads
4. Stringers

13-34. For aircraft applications, all EXCEPT which of the following features is an advantage of plastic over glass?

1. Its ease of repair
2. Its ease of fabrication
3. Its lightness in weight
4. Its ability to resist scratches

13-35. What term refers to small surface fissures that develop on plastic materials?

1. Hazing
2. Glazing
3. Crazing
4. Cracking

13-36. Upon finding a section of plastic material that is crazed, what action, if any, should you take to correct the problem?

1. Buff it with polish
2. Wipe it with naphtha
3. Rub it with turpentine
4. None

13-37. By sanding or buffing a plastic surface too long or too vigorously in one spot, you can cause which of the following problems?

1. Cracking or crazing
2. Softening or burning
3. Bleaching or glazing
4. Discoloration or hazing

13-38. Standard buffing compounds on transparent plastics are usually composed of very fine alumina in combination with which of the following materials?

1. Wax only
2. Tallow only
3. Wax or tallow only
4. Wax, tallow, or grease

13-39. When you mount plastic panels, what is the minimum prescribed thickness for the packing material?

1. 1/16 in.
2. 1/8 in.
3. 3/16 in.
4. 1/4 in.

13-40. When repairing minor surface damage to reinforced plastics, you should apply which of the following materials to the damaged area?

1. Two coats of catalyzed resin heated to 112°F
2. One or more coats of room-temperature catalyzed resin
3. Three coats of paste composed of catalyzed resin and nylon fibers heated to 137°F
4. One coat of room-temperature paste composed of catalyzed resin and short glass fibers

13-41. When using the stepped method to repair ply damage to solid laminates, which of the following procedures should you observe to ensure maximum strength of the repaired area?

1. Cut the replacement glass fabric pieces to an exact fit with the weave running in the same direction as the existing plies
2. Ensure that the replacement pieces are slightly thicker than the existing plies
3. Install the replacement pieces with the fabric plies overlapping the existing plies
4. Replace every other piece of damaged fabric

13-42. A reinforced plastic component with a honeycomb core has damage that extends completely through one facing and into the core. What is the preferred method of repair for this component?

1. Plugged
2. Stepped
3. Scarfed
4. Delaminated ply

13-43. The scarfed method is normally used to repair small punctures in reinforced plastics up to what maximum dimension?

1. 3 or 4 in.
2. 5 or 6 in.
3. 7 or 8 in.
4. 9 or 10 in.

13-44. When repairing a puncture in a piece of reinforced plastic using the stepped method, what material should you use to cover the repair area while it cures?

1. Graphite grease
2. Petroleum jelly
3. Cellophane sheeting
4. Aluminum barrier paper

13-45. Rain erosion-resistant coating MIL-C-7439, Class II, has an additional surface treatment included in the kit for what purpose?

1. To absorb radar waves
2. To minimize radio noise
3. To reflect ultraviolet light
4. To lower its internal working temperature

13-46. A sandwich construction material is delaminated with facing-to-core voids of less than 2.5 inches in diameter. Which of the following repair methods should you use?

1. Apply a flush patch by using thick cloth soaked in Thermofoam 706
2. Apply a coat of Thermofoam 706 to the surface and cover it with kraft paper
3. Inject a nonexpandable forming resin into the drilled holes over the void area with a syringe
4. Inject an expandable forming resin into the drilled holes over the void area with a pressure-type caulking gun

IN ANSWERING QUESTION 13-47, REFER TO FIGURE 14-17 IN THE TEXTBOOK.

13-47. The corners of the rectangular cutout must have what minimum radius?

1. 1/8 in.
2. 1/4 in.
3. 3/8 in.
4. 1/2 in.

13-48. You are repairing a balsa wood core component. When you use two rows of rivets, the inner patch should overlap the hole in the core by what prescribed amount?

1. 1 in.
2. 2 in.
3. 3 in.
4. 4 in.

IN ANSWERING QUESTION 13-49, REFER TO TABLE 14-1 IN THE TEXTBOOK.

13-49. Which of the following components of SH-60B aircraft are manufactured from advanced composite materials?

1. The gearboxes
2. The scarf joints
3. The upper canopies
4. The horizontal stabilizers

13-50. Which of the following factors is a disadvantage of advanced composite materials over metals?

1. Repair capability
2. Expense of materials
3. Corrosion resistance
4. Weight of the material

13-51. In an advanced composite material, what is the homogeneous resin binder known as?

1. Pulp
2. Paste
3. Matrix
4. Laminate

13-52. The damage to advanced composite materials may be categorized in which of the following ways?

1. Natural
2. Organic or physical
3. Organic or environmental
4. Physical or environmental

13-53. When performing a tap test on advanced composite materials, you should use a hammer that weighs about 3 ounces.

1. True
2. False

13-54. A section of advanced composite material has water trapped in the honeycomb area. This is what class of repairable damage?

1. Class IV
2. Class V
3. Class VI
4. Class VII

13-55. The drill motors used on advanced composite materials should be capable of what maximum speed?

1. 5,000 rpm
2. 6,000 rpm
3. 7,000 rpm
4. 8,000 rpm

13-56. When working with advanced composite materials, which of the following personnel hazards should be your principal concern?

1. Contact with the dust on your hands
2. Contact with the matrix on your clothing
3. Inhalation of airborne dust and fibrous particles
4. Inhalation of fumes before the matrix has completely cured

13-57. The flashpoints of solvents and resins for composite materials are usually around what minimum temperature?

1. 500°F
2. 200°F
3. 300°F
4. 400°F

13-58. On Navy aircraft, the paint system is identified with a stencil or decal at what location?

1. On the right side of the aft fuselage
2. On the left side of the aft fuselage
3. On the right side of the upper wing
4. On the left side of the upper wing

13-59. Which of the following statements pertaining to aircraft stripping is NOT correct?

1. The stripper should be spread in a thin coat
2. The stripper should be applied with fiber brushes
3. The aircraft should be located outside if possible
4. The aircraft's joints or seams in the stripping area should be masked

13-60. Paint feathering may be accomplished with all EXCEPT which of the following items?

1. 240 grit aluminum oxide cloth
2. 280 grit aluminum oxide cloth
3. 320 grit aluminum oxide cloth
4. Flap brush

13-61. After epoxy-polyamide primer is sprayed, it should be allowed to air dry for what minimum amount of time?

1. 15 min
2. 30 min
3. 45 min
4. 60 min

13-62. You mixed aliphatic polyurethane paint and did not use it for more than 3 hours. Which of following problems will occur if you try to rethin the paint?

1. Fish eyes
2. Dry spots only
3. Orange peel only
4. Dry spots or orange peel

13-63. The epoxy-polyamide topcoat is mixed in what ratio of (a) pigmented component to (b) clear resin?

1. (a) One (b) one
2. (a) One (b) two
3. (a) Two (b) one
4. (a) Two (b) three

13-64. To obtain excellent adhesion, elastomeric rain erosion-resistant coating, MIL-C-7439, should be allowed to dry for what minimum number of days?

1. 5 days
2. 6 days
3. 7 days
4. 8 days

13-65. When you lay out the blue border that outlines the entire design of the national insignia, the border should be what fractional part of the radius of the blue circle in width?

1. 1/16
2. 1/8
3. 3/16
4. 1/4

13-66. A pressure-feed spray gun is designed to operate at (a) what fluid volume and (b) what air pressure?

1. (a) Low (b) low
2. (a) Low (b) high
3. (a) High (b) low
4. (a) High (b) high

13-67. Prior to use, what component of a spray gun should be removed and treated with oil?

1. The air valve packing
2. The fluid needle spring
3. The fluid needle packing
4. The trigger bearing screw

13-68. When spraying epoxy-polyamide and polyurethane finishes, you should hold the gun at what prescribed distance from the work?

1. 4 to 8 in.
2. 6 to 10 in.
3. 8 to 12 in.
4. 10 to 14 in.

13-69. Which of the following spray gun problems causes dusting?

1. Excessive air pressure
2. Excessive fluid pressure
3. Insufficient air pressure
4. Insufficient fluid pressure

13-70. Which of the following types of sealants set and cure by evaporation of the solvent?

1. Drying sealants
2. Curing sealants
3. Pliable sealants
4. Flexible sealants

13-71. You should apply a sealant to a faying surface by what method?

1. A brush
2. Spraying
3. A spatula
4. Injection

13-72. What type of sealing compound, MIL-S-81733, is applied with a spray gun?

1. Type I
2. Type II
3. Type III
4. Type IV

ASSIGNMENT 14

Textbook Assignment: "Nondestructive Inspections, Welding, and Heat Treatment," chapter 15, pages 15-1 through 15-45.

14-1. What manual covers the theory and general applications of various methods of NDI?

1. NAVAIR 01-1A-12
2. NAVAIR 01-1A-16
3. NAVAIR 01-1A-17
4. NAVAIR 01-1A-20

14-2. Currently active NDI technicians are required to be recertified at least how often?

1. Every 5 years
2. Every 2 years
3. Every 3 years
4. Every 4 years

14-3. NDI operators must use the NDI method(s) for which they are certified at least how often?

1. Once a month
2. Twice a month
3. Once a quarter
4. Twice a quarter

14-4. What command has cognizance over the NDI program?

1. NADOC
2. NADEP
3. NAESU
4. NAVAIR

14-5. Aircraft controlling custodians have all EXCEPT which of the following NDI program responsibilities?

1. Designating NDI specialist as required
2. Designating an NDI program manager
3. Providing NDI training for NADEPs as requested
4. Ensuring that NDI equipment, laboratories, and personnel are audited as required

14-6. The detection of flaws or defects in material with a high degree of accuracy and reliability by the use of NDI methods depends primarily on which of the following factors?

1. The availability of a trained and experienced technician
2. The availability of a large and well-equipped facility
3. The type of material being inspected
4. The detection method used

14-7. You are performing a process that consists of inducing a magnetic field into a part and applying magnetic particles in a liquid suspension or dry powder. What type of NDI inspection are you conducting?

1. Ultrasonic
2. Radiographic
3. Eddy current
4. Magnetic particle

14-8. Which of the following magnetization methods are used in magnetic particle inspections?

1. Linear only
2. Circular only
3. Circular and longitudinal only
4. Linear, circular, and longitudinal

14-9. To magnetize both the inside and outside of parts that are hollow or tubelike, you should place them on a copper bar and pass current through them.

1. True
2. False

14-10. The particles used in magnetic particle testing must possess which of the following qualities?

1. High permeability and high retentivity
2. High permeability and low retentivity
3. Low permeability and high retentivity
4. Low permeability and low retentivity

14-11. Concerning a radiographic NDI inspection, all EXCEPT which of the following statements are correct?

1. It is one of the most expensive
2. It can be used on nonmetallic materials
3. It is the least sensitive method of crack detection
4. It should only be used on items that are accessible or favorably oriented

14-12. If the whole body of a person is exposed to a very large dose of radiation, what would most likely be the result?

1. Death
2. Cancer
3. Leukemia
4. Skin damage

14-13. Ultrasonic NDI inspection information is displayed by what means?

1. Video tape
2. Photographic film
3. Cassette tape recorder
4. Cathode–ray tube screen

14-14. What ultrasonic NDI inspection method projects a beam of vibrations that travel along or just below the surface of the material?

1. Immersion
2. Angle beam
3. Surface wave
4. Straight beam

14-15. What type of eddy current probe or coil is used on plates, sheets, or irregular-shaped parts?

1. Inside probe
2. Surface probe
3. Encircling coil
4. Bobbin-type coil

14-16. The developer used in a dye penetrant NDI inspection serves what purpose?

1. It neutralizes the dye
2. It speeds the drying of the penetrant
3. It helps draw any trapped penetrant from the discontinuities
4. It aids the penetrant in filling any discontinuities that are below the surface of the material

14-17. Training programs and testing facilities for those personnel desiring to qualify as aircraft welders are available at which of the following commands?

1. NADOC
2. NADEP
3. NAESU
4. NATTC

14-18. The groups of metals for which separate and distinct welding certifications are required are specified in what manual?

1. NAVAIR 01-1A-11
2. NAVAIR 01-1A-12
3. NAVAIR 01-1A-16
4. NAVAIR 01-1A-34

14-19. In the oxyacetylene gas welding process, the welding torch is used for which of the following purposes?

1. To provide a clamping device for the gas tubes and rods
2. To direct the flame against the metal only
3. To mix the gases in proper proportions only
4. To direct the flame against the metal and mix the gases in proper proportions

14-20. Which of the following statements pertaining to oxygen is NOT correct?

1. It is flammable
2. It is colorless
3. It is tasteless
4. It is heavier than air

14-21. On a single-stage oxygen regulator, the outlet pressure gauge provides what indication?

1. The working pressure
2. The mixing ratio of the gases
3. The amount of oxygen in the cylinder
4. The amount of acetylene in the cylinder

14-22. When burned with oxygen, acetylene produces a flame in what temperature range?

1. 1,200 to 3,300°F
2. 2,850 to 4,500°F
3. 5,700 to 6,300°F
4. 6,150 to 7,500°F

14-23. The oxygen pressure is much higher than the acetylene pressure in what type of oxyacetylene welding torch?

1. The jet type
2. The injector type
3. The high-pressure type
4. The equal-pressure type

14-24. On oxyacetylene welding equipment, what color and thread type identifies the (a) oxygen hose and (b) acetylene hose?

1. (a) Green with right-handed threads
   (b) red with left-handed threads
2. (a) Green with left-handed threads
   (b) red with right-handed threads
3. (a) Black with right-handed threads
   (b) green with left-handed threads
4. (a) Red with left-handed threads
   (b) black with right-handed threads

14-25. What type of flame should you use when welding bronze with an oxyacetylene welding rig?

1. Neutral
2. Oxidizing
3. Nitrating
4. Carburizing

14-26. If you light the acetylene only on an oxyacetylene welding torch, the flame will be what color?

1. Red
2. Blue
3. Yellow
4. Orange

14-27. A torch flashback can be caused by all EXCEPT which of the following factors?

1. Loose connections
2. Improper pressures
3. Overheating of the torch
4. Touching the tip of the torch against the work

14-28. When torch welding, you should hold the white cone of the flame at what prescribed distance from the surface of the metal?

1. 1/8 in.
2. 1/4 in.
3. 3/8 in.
4. 1/2 in.

14-29. What welding method should you use when welding material more than 1/8 inch thick?

1. Puddle
2. Ripple
3. Backhand
4. Forehand

IN ANSWERING QUESTIONS 14-30 THROUGH 14-33, SELECT FROM COLUMN B THE BASIC WELD JOINT THAT MATCHES ITS DESCRIPTION IN COLUMN A.

	A. DESCRIPTION	B. WELD JOINT
14-30.	Made by joining two members located approximately at right angles to each other	1. Tee
		2. Edge
		3. Butt
		4. Corner
14-31.	Made by welding two or more parallel members	
14-32.	Made by welding two plates whose surfaces are 90° of each other at the joint	
14-33.	Made by joining two pieces of material-edge to edge without any overlapping	

14-34. In the GTA welding process, the shielding gas is used for which of the following purposes?

1. To reflect the heat from the electrode
2. To produce a more concentrated heat to the weld zone
3. To lay the weld bead faster and lengthen the weld arc
4. To protect the molten weld metal from atmospheric contamination

14-35. In the GTA welding process, the greatest concentration of heat at the electrode results from what arrangement of (a) current and (b) polarity?

1. (a) dc (b) reverse
2. (a) dc (b) straight
3. (a) ac (b) reverse
4. (a) ac (b) straight

14-36. You should use water-cooled GTA welding torches when welding with current above what prescribed amperage?

1. 50 amp
2. 100 amp
3. 150 amp
4. 200 amp

14-37. What is the most popular gas used in the GTA welding process?

1. Radon
2. Argon
3. Helium
4. Nitrogen

14-38. To strike the arc using an ac GTA welding machine, you should angle the end of the torch toward the work so that the electrode is at what prescribed distance above the plate?

1. 1/8 in.
2. 1/4 in.
3. 3/8 in.
4. 1/2 in.

14-39. In the GMA welding process, what factor determines the melting rate of the filler wire?

1. The speed rate of the welder
2. The diameter of the filler wire
3. The level of the welding current
4. The size of the area to be welded

14-40. When you are GMA welding with a constant-voltage power source, what condition will occur as a result of any changes in the length of the welding arc?

1. The shielding gases will automatically shut off
2. The welding current will automatically change
3. The wire driven mechanism will automatically adjust the feed speed
4. The welding gun will automatically stop delivering the electrode until the problem has been resolved

14-41. In the GMA welding process, what type of shielding gas is preferred for welding thick materials?

1. Neon
2. Argon
3. Helium
4. Hydrogen

14-42. In the GMA welding process, what basic welding position is preferred for most joints because it improves the molten metal flow, bead contour, and gives better gas protection?

1. Flat
2. Vertical
3. Overhead
4. Horizontal

14-43. For safety purposes, when welding cables must reach some distance from the machine, you should run the cables overhead, if possible.

1. True
2. False

14-44. What term refers to metals with iron bases?

1. Nonferrous
2. Ferrous
3. Ironic
4. Alloy

14-45. The heat-treatment cycle includes all EXCEPT which of the following events?

1. Soaking
2. Heating
3. Cooling
4. Misting

14-46. When steel parts have an uneven cross section, what factor determines the soaking period?

1. Its total weight
2. Its lightest section
3. Its heaviest section
4. Its overall length and width

IN ANSWERING QUESTIONS 14-47 THROUGH 14-49, SELECT FROM COLUMN B THE HEAT-TREATMENT PROCESS THAT MATCHES ITS USE LISTED IN COLUMN A. NOT ALL ITEMS LISTED IN COLUMN B WILL BE USED.

A. USE	B. PROCESS
14-47. To relieve the strains induced during hardening	1. Normalizing
14-48. To reduce residual stresses or induce softness	2. Annealing
14-49. For parts that require a wear-resistant surface	3. Tempering
	4. Case hardening

14-50. At ordinary temperatures, the carbon in steel exists in the form of iron carbide particles. These particles are known by what name?

1. Cordite
2. Ferrite
3. Pearlite
4. Austenite

14-51. In the heat-treatment process of steel, the element that normally has the greatest influence is silicon.

1. True
2. False

IN ANSWERING QUESTION 14-52, REFER TO TABLE 15-1 IN THE TEXTBOOK.

14-52. What color is steel at 1,825°F?

1. Lemon
2. Salmon
3. Orange
4. Light lemon

14-53. When water is used as a quenching medium for steel, the water bath should be held at what prescribed temperature?

1. 32°F
2. 48°F
3. 55°F
4. 65°F

14-54. When steel is heated above its critical temperature and then slowly cooled, what is the final product called?

1. Sorbite
2. Pearlite
3. Troostite
4. Martensite

14-55. After welding a ferrous metal, you should use the normalizing process of heat treatment for what reason?

1. To reduce its carbon content
2. To induce internal stresses
3. To remove all strains
4. To make it harder

14-56. Which of the following carburizing methods produces only a thin case?

1. Pack
2. Gaseous
3. Nitriding
4. Cyaniding

14-57. What prescribed temperature is required for nitriding steel parts?

1. 950°F
2. l,150°F
3. 1,300°F
4. 1,400°F

14-58. Aluminum alloys should be heated by the use of which of the following methods?

1. An air furnace
2. A molten salt bath only
3. An electric furnace only
4. A molten salt bath or an electric furnace

14-59. When a nonferrous part is quenched, what is the maximum recommended time between the part's removal from the heat and immersion?

1. 10 sec
2. 15 sec
3. 20 sec
4. 25 sec

14-60. When annealing an aluminum part in a salt bath, you should use equal parts of which of the following chemicals?

1. Epsom salt and sodium nitrate
2. Epsom salt and silver nitrate
3. Potassium nitrate and baking soda
4. Potassium nitrate and sodium nitrate

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(Did not complete the course)

In the event of disenrollment, submit this form to the address below with any unused ADP answer sheets. You need not return any other course material. If the course material is CLASSIFIED, you must submit the material to your command for proper disposition of CLASSIFIED material. If the training manual and NRTC courses are designated with distribution statements B, C, D, E, F, or X, and you decide to dispose of the material, you must destroy the material to prevent disclosure of contents or reconstruction of the document.

☐ OTHER REASON (Specify) :

PRIVACY ACT STATEMENT

Under authority of Title 5, USC 301, information regarding your military status is requested to assist in processing your comments and prepare a reply. This information will not be divulged, without written authorization, to anyone other than those within DOD for official use in determining performance.

COMMANDING OFFICER
NETPMSA CODE 074
6490 SAUFLEY FIELD RD
PENSACOLA FL 32559-5000

STUDENT COMMENT SHEET

THIS FORM MAY BE USED TO SUGGEST IMPROVEMENTS, REPORT COURSE ERRORS, OR TO REQUEST HELP IF YOU HAVE DIFFICULTY COMPLETING THE COURSE.

Date_____

SSN_____

From: _____
NAME (Last, first, M.I.), RANK, RATE, CIVILIAN

_____
STREET ADDRESS, APT #

_____ ZIP CODE_____
CITY, STATE

To: COMMANDING OFFICER
NETPMSA CODE 0315
6490 SAUFLEY FIELD RD
PENSACOLA FL 32509-5237

Subj: NRTC AVIATION STRUCTURAL MECHANIC (H&S) 3&2, NAVEDTRA 82338

1. The following comments are hereby submitted:

PRIVACY ACT STATEMENT

Under authority of Title 5, USC 301, information regarding your military status is requested to assist in processing your comments and prepare a reply. This information will not be divulged, without written authorization, to anyone other than those within DOD for official use in determining performance.

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.....(Fold along dotted line and staple or tape).....

DEPARTMENT OF THE NAVY

COMMANDING OFFICER
NETPMSA CODE 0315
6490 SAUFLEY FIELD RD
PENSACOLA FL 32509-5237

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300

COMMANDING OFFICER
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☐ USN ☐ USNR ☐ ACTIVE ☐ INACTIVE OTHER (Specify) _____ DATE MAILED _____

SCORE

	1 T	2 F	3	4			1 T	2 F	3	4			1 T	2 F	3	4	
1	☐	☐	☐	☐		26	☐	☐	☐	☐		51	☐	☐	☐	☐	
2	☐	☐	☐	☐		27	☐	☐	☐	☐		52	☐	☐	☐	☐	
3	☐	☐	☐	☐		28	☐	☐	☐	☐		53	☐	☐	☐	☐	
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THIS FORM MAY BE LOCALLY REPRODUCED